TECHNOLOGY DEPARTMENT

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FLYING

FEBRUARY 1949 25 CENTS

The Air Navy

BASES ITS POWER ON CARRIERS AND PLANES

page 15

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The Atom Bomb

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Four Lives **and a new ship were at stake . . . but the *automatic* action of the AEROMATIC Propeller gave pilot Faulkner split-second full power with flat pitch. Split-second, automatic pitch is what counts in emergencies . . . it counts in normal operations, too.**

POWER LINES cut his final approach at the last minute! The pilot, Mr. Edward Faulkner, president of Faulkner Aviation Industries, was really up against it! He had a full load, no wind and an air speed of only 60 MPH! Here's his own story of what happened . . .

"WHILE fully loaded and giving a demonstration, I was coming in to land on an unfamiliar runway. I did not notice the power lines until they were directly in front of me. My air speed was only 60 MPH . . . I applied full throttle at once, attempting to clear the lines, or force my way through them. Our landing gear was caught momentarily on the wires . . . but we ended up in a normal landing . . . as though nothing had happened. No one was hurt. The damage was negligible. We all agreed that a serious crash had been averted due to the rugged stability and safety factors of the Bellanca Cruisair and the fact that *the Aeromatic Propeller immediately went into flat pitch and allowed us instant full power.* I continued my demonstration with the same passengers and, as a result, obtained five orders for planes, *all to be equipped with Aeromatic Propellers.*"

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Keeps ice from choking a jet's throat

ICING conditions pose a brand-new problem for jet planes. If ice forms in the narrow air intake of a jet engine, it chokes off the vital air supply. Without air, there's no combustion. And the jet engine quits cold.

To B. F. Goodrich engineers, this looked like a problem for electrically heated rubber—thin, tough rubber with a core of resistance wires. They designed an electric rubber lining for the jet's diffuser cowl, in the "throat" that funnels air to the combustion chamber (see picture above).

The resistance wires were precisely arranged to concentrate heat where it was most needed. A thermostatic control was added. Then, with electric rubber supplying the heat, the diffuser cowl was put through a series of rugged icing tests. No ice formed!

Diffuser cowls lined with B. F. Goodrich electric rubber are now in use on a new production model jet bomber.

B. F. Goodrich electric rubber is the most efficient way of getting the right amount of anti-icing heat to the right spot. It simplifies design, saves weight. It is very flexible and fits curved surfaces tightly and smoothly. And it requires little power to operate.

Besides diffuser cowls, B. F. Goodrich electric rubber has done a successful anti-icing job on propellers, control surfaces, spinner domes, air scoops, antenna and pitot masts, hydraulic lines, water tanks and many other airplane parts? It is a typical development of the B. F. Goodrich research that supplies aviation with effective answers to its tough problems. *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

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THE COVER: McDonnell Banshee (F2H), produced for the Navy, is not yet operational.

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FLYING

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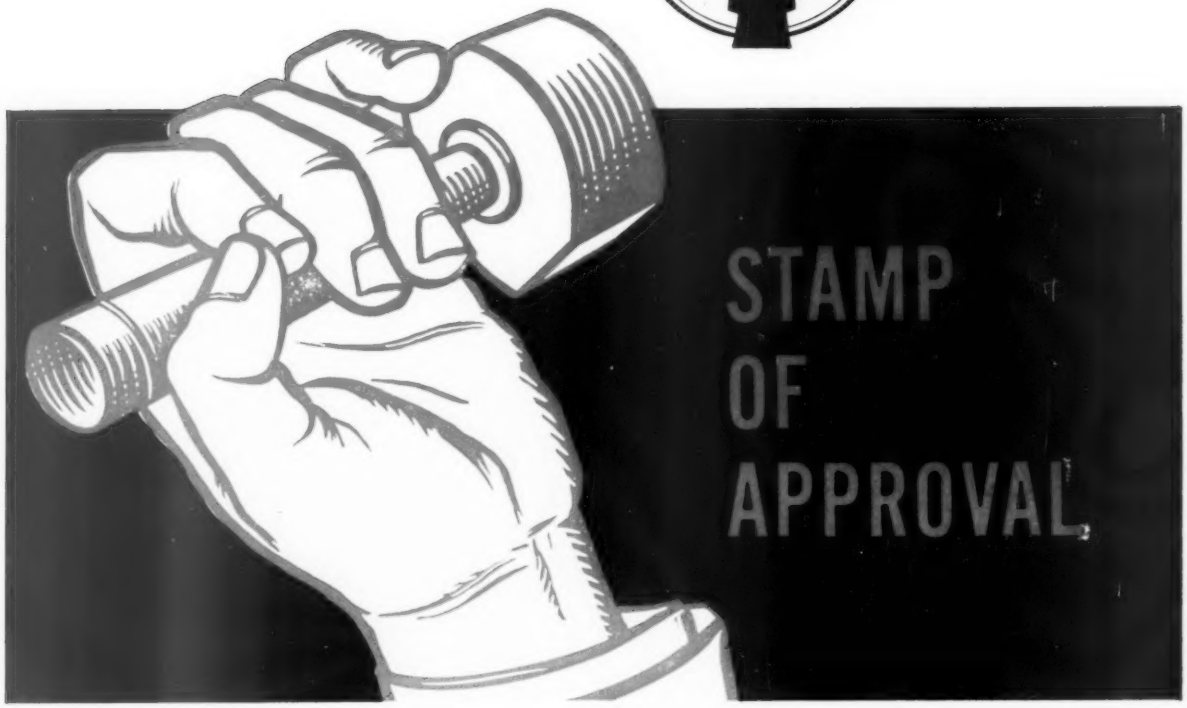

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PRATT & WHITNEY AIRCRAFT

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Private plane owners

Fleet operators

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Here is why:

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THE MAIL BOX

DIDN'T MASTER IT

The gentleman who signs himself as a 2,000-hour Naval Aviator [Lieut. Daniel G. Forbes, I Learned About Flying From That, December FLYING] surely must have "Dilberted" all through his flying. A master switch does not control the operation of a magneto—unless Aeroncas in the east are different from ours out here. . . .

ROBERT A. VANDERVERT
Owner and Manager
Vanderverts School of Flying
Spokane, Wash.

Forbes says an Aeronca *Champion* has a Lycoming engine. *It's a Continental.*

GRADY CONLEY
Prestonburg, Ky.

. . . I have yet to see a Lycoming-powered one.

ANTHONY P. NEJA
Patuxent River, Md.

Forbes apparently didn't learn *all* about flying from "that."

SAMUEL J. HOLLIST
Bozeman, Mont.

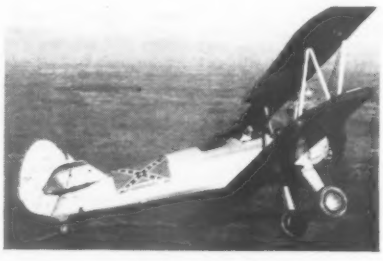
Nuts . . .

M. L. NOEL
San Antonio, Tex.

● FLYING'S "I Learned About . . ." editor was sleeping at the Master Switch. And Lieut. Forbes still has something to learn.—ED.

CONFEDERATE AIR FORCE

Where can I get some information on the "Confederate Air Force"? Some of us



. . . shades of Jeff Davis.

Southerners, suh, would like mighty fine to join up.

J. M. T. FITZPATRICK
New Orleans, La.

● Write: A. T. McSorley, 1423 Spencer Avenue, New Bern, North Carolina.—Ed.

POST TAXI FARE

Every airport operator should post the taxi fares to nearest cities. They should be written in big red letters.

On my recent trip to Cleveland we were overcharged $3.75 because the taxi didn't have a meter and the driver played us for suckers.

WILLIAM J. KNOLL, JR.
Kearney, Nebr.

BARE FACTS

Your circulation must be enormous. I've been constantly reminded of my part in "Crash Landing in a Nudist Camp" [Flat Spins, December FLYING] by persons, telephone and letter.

. . . I only wish the article had stated how wonderfully the nudists treated me!

JOHN S. KLEPPER
Hellertown, Pa.

I was with Klepper when we crash-landed in that nudist camp . . .

If people only knew how well the nudists treated us, they'd change their minds about that cult . . . John and I both praise them highly.

. . . More power to them and their movement.

FORREST R. MUSHLITZ
Bethlehem, Pa.

BIGGER ELEPHANT

If Curtis Fuller ["An Elephant Sat on Me," November FLYING] thinks four G's is bad, I wonder what he'd do at a little over 11 G's? One of our squadron planes (a Curtiss *Helldiver*) pulled a recorded 11 G's while recovering from a dive-bombing run on the U.S.S. Randolph during Atlantic Fleet maneuvers in February and March, 1946. The pilot, Lieut. C. J. C. Davis and his radioman seemed none the worse after the incident. Only damage was a slight ripple on the wings, which were replaced. The wings, incidentally, were built by Hudson Motor Car Company.

. . . They got a hit, too!

D. A. MILLER
Attack Squadron 174
NAS, Quonset Point, R. I.

THE THUNDERJET

In "Specifications of 48 U.S. Jet Aircraft" [December FLYING] you say the Republic F-84 has a range of 600-plus miles. Wanna bet?

CLARK L. BLAIR
Las Vegas, Nev.

● No. FLYING erroneously gave the *combat radius* (over 600 miles) instead of the range. The *Thunderjet's* range is "over 1,500 miles."—ED.

RUDDERMENTS

Hearty congratulations on Don B. Crouse's "Rudderments of Flying" [October FLYING]. It's the best exposition on turns and use of the rudder that I have ever read. I thought I knew all the answers, but sure know now that I didn't.

R. C. REYNOLDS
Assam, India

(*Continued on page 78*)

Swift 125 PAYS ITS OWN WAY

with Big Plane Utility . . . Light Plane Economy

FOR BUSINESS OR PLEASURE, you'll find the Swift 125 practical for fast, safe, comfortable flying. Even though you're a newly licensed pilot, the Swift 125 is easy to fly. You'll get real pleasure out of the extra power and speed of the 125 h.p. Continental engine . . . you'll fall in love with the smooth control response and stability of the modern low-wing design. You'll like the economy of operation and upkeep of this all-metal plane. Your nearby Swift Dealer invites you to fly the Swift 125. Compare it with any other plane under $6,000 . . . chances are, you'll choose the Swift.

Metal Top Canopy—Shades cabin from direct rays of sun. Hinges up and locks for easy entrance and exit. Now standard equipment on all models of the Swift 125.

Non-Stop Range Increased 25%—575 miles maximum cruising range with new auxiliary tank (available as accessory). New fuel venting system for extra safety.

New Cabin Window improves appearance, gives side visibility. Flat shelf behind seat for hats, log books.

SWIFT 125 SCORES *HIGH* WITH MORE UTILITY FOR LESS COST!

FEATURE	Swift 125	Planes A $7-8,000	Planes B $5-6,000	Planes C $3-4,000
ALL-METAL CONSTRUCTION	YES	YES	NO	NO
LOW-WING DESIGN	YES	YES	NO	NO
RETRACTABLE LANDING GEAR	YES	YES	NO	NO
HYDRAULIC FLAPS	YES	YES	YES	NO
HYDRAULIC SHOCK ABSORBERS	YES	YES	NO	NO
STEERABLE TAIL WHEEL	YES	YES	YES	NO
SELF-STARTER AND GENERATOR	YES	YES	YES	NO
AUTOMATIC PITCH PROPELLER	YES	YES	YES	NO
125 HP. ENGINE, plus	YES	YES	YES	NO
140 M.P.H. CRUISING SPEED, plus	YES	YES	NO	NO
48 M.P.H. LANDING SPEED, minus	YES	NO	YES	YES
1,000 F.P.M. RATE OF CLIMB	YES	NO	NO	NO
425 MILE RANGE, plus	YES	YES	YES	NO
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Swift 125

NOTES ON CIVIL FLYING

. . . **The Luscombe Sedan** will cruise 145 m.p.h. with the new two-position Hartzell prop, installation of which was recently approved by the CAA.

. . . **Rockets** burn so much fuel that it seems doubtful they will ever be used as the principal powerplants for practically useful aircraft, says Hugh L. Dryden, NACA director of aeronautical research.

. . . **Cloud seeding** with dry ice pellets or water has not caused enough rain to be of economic importance, according to recent experiments of USAF and the Weather Bureau. The Cloud Physics Project found little evidence that cloud seeding would start a storm. In some tests, seeding made the clouds completely disappear. In 79 tests, only five clouds produced rain when there was no natural rain within 30 miles.

. . . **Mr. & Mrs. Kenneth R. McIntyre,** Vandalia, Ohio, who fly a BT-13, often take their son Larry with them. Larry wears cut-down parachute harness and

sits on Mrs. McIntyre's lap, with his harness hooked through the front of hers. In an emergency both would use her chute—together they weigh only 140 pounds.

. . . **Chicago's Northerly Island** Airport, on the lake front, was opened December 10. The field is less than 10 minutes from the Loop area. It consists of a single runway 2,800 feet long and 150 feet wide, a taxiway, and parking space for 200 planes and 275 automobiles.

. . . **Since January 1,** observation of upper wind airspeeds have been reported in knots instead of m.p.h. The change has been made to conform to international practice. Pilots still wanting to use m.p.h., should convert knots to miles by multiplying by 1.15.

. . . **Embry Riddle** International School of Aviation will remain at Opa Locka, Fla. The Navy had planned to reactivate the airport, and the big school with other operators at the port was making plans to move. Now the Navy has changed its mind.

. . . **Amvets** are backing Willie G. Slocumb, Jr., of Portsmouth, Va., in a suit to enjoin Veterans Administrator Carl R. Gray, Jr., from "misinterpreting" the law regarding GI flight training for veterans. The complaint claimed that 74 per cent of all GI flight training applications in a two-month period had been denied or deferred by Gray.

. . . **New type flashing lights** for lightplanes will be produced by Temco to sell for much less than those previously available. Flasher types include two-circuit light flashers, single-circuit flashers, and code flashers. The flashing sequence of the Flash-Aire lights is two-thirds on and one-third off 40 times per minute.

. . . **Lear Omnimatic** is a new compact lightweight automatic VHF navigational system. The system includes VHF receiver, VHF transmitter, power supply, and the "omniscope" which gives automatic compass bearings of the station. The equipment is also adaptable to ILS. Weight of the complete unit is 24 pounds. The receiver and transmitter alone are about $400, and the complete omnimatic system will cost about $700.

. . . **Private pilots** complain that they cannot find Trip-Eze at most airports. Tri-Eze is a medicated chewing gum containing hyoscine hydrobromide which helps prevent motion sickness. It can be ordered direct from Multiproducts Company, Inc., 1424 K Street, N.W., Washington 5, D. C.

. . . **A new organization,** the National Real Estate Flyers Association, was formed in New York at the convention of the National Association of Real Estate Boards. Alex J. Wachowski, Flint, Mich., was elected president.

. . . **Stinson Division** of Convair has been bought by Piper Aircraft which will continue to manufacture and sell Stinson planes and parts. Tools, jigs and other equipment will be moved to Lock Haven, Pa. Price was reported to be $2,000,000.

. . . **An estimated 7,000** personal airplanes were sold in 1948.

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Municipal Airport
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—ST. LOUIS
St. Louis Flying Service
Kratz Airport—Phone: TErryhill 5-3130

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Southern Ohio Aviation Co.
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P. O. Box 361—Phone: 44613

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TEXAS—FORT WORTH
General Aeronautics, Inc.
Meacham Field
Phone: 6-2015 (day) and 6-7038 (night)

ARIZONA—PHOENIX
Thunderbird Aviation Corp.
Sky Harbor Airport, 2416 East Buchanan
Phone: 4-7559

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Washington Aircraft &
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OREGON—PORTLAND
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EVEN MORE LUXURIOUS COMFORT!
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NEW MECHANICAL REFINEMENTS!
Many new and exclusive refinements... more and still better standard equipment ...place the *Ryan Navion* in a class with the *most modern* commercial airliners. Now you can fly your *Ryan Navion* with even greater confidence.

NEW STREAMLINED BEAUTY!
Inside and out, the new *Ryan Navion* is exciting! More performance; more comfort; more features for still greater owner confidence and satisfaction. You'll agree "It's *Navion* Again" when you check all 29 new advancements for '49. Send today for colorful, free brochure giving complete details of the 1949 *Ryan Navion*.

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Ryan Navion

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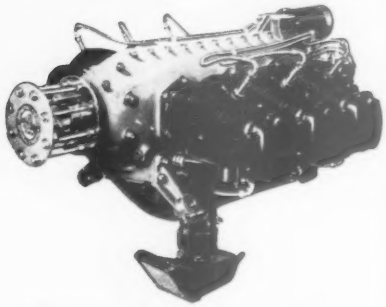
They know that wherever they fly, Continental Motors service will be there ahead of them. Continental Motors has accepted the obligation imposed by the steadily growing use of planes, and is constantly enlarging and improving its service.

The coast-to-coast network of Continental stations is now backed up by two new master parts depots — at Los Angeles and Dallas — and service headquarters at Muskegon has been reorganized and streamlined for faster delivery of parts. For Continental knows the part that service has played, and is playing, in making Continental engines fliers' first choice.



Foreign service

The Continental C125 has been adopted for many of the personal and executive planes now being designed or manufactured in Europe, Asia and South America.

To maintain these planes, and the thousands that have been exported, you will now find Continental parts and service in almost every free country of the world. This reflects the world-wide acceptance of Continental engines as the most efficient and dependable source of power.

Continental Motors Corporation

MUSKEGON, MICHIGAN

CONTINENTAL

Red Seal

ENGINES

MILITARY NEWS

. . . **World's first** B-36-equipped bomber wing is Seventh Bomb Wing (VH) at Carswell AF Base, Fort Worth, Tex. It has 18 B-36As. First delivery of the higher-powered B-36B (six 3,500-h.p. Pratt & Whitney engines) was made Thanksgiving day.

. . . **Reorganization** of Air Force puts the new Continental Air Command in direct control of six regional Air Forces, to which units now assigned to Air Defense Command and Tactical Air Command will be transferred. The CAC, commanded by Lieut. Gen. George E. Stratemeyer, will strengthen Air National Guard and Air Reserve programs.

. . . **Berlin Air Lift,** now using 230 C-54s, flew 409,256 tons into the German capital in its first five months.

. . . **Women technicians** without prior military experience may apply for Reserve Commissions in the Air Force. Previously, only women with a record of military service were eligible for commissions.

. . . **Air National Guard** now has 459 units in training.

. . . **Simulated airspeed** of about 3,960 m.p.h.—more than five times the speed of sound—was reached by the Navy recently with improved German wind tunnels. The new record (Mach 5.18) was set with weapon-testing wind tunnels measuring 16 inches square.

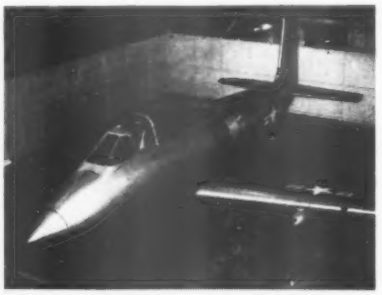
. . . **No more deliveries** of jet engines to Russia "are contemplated" by the British, Supply Minister George Strauss announced recently. Between December, 1946, and January, 1948, 55 jet engines were delivered to the Communists.

. . . **Fastest U. S. bomber,** the Boeing *Stratojet* (B-47), is being produced at Boeing's Wichita plant. Seven thousand persons are now on the Boeing payroll, with 15,000 scheduled for employment by mid-1949.

. . . **Five crewless B-17s,** flown by radio control, are being ditched in the Gulf of Mexico off Eglin Field, Fla., in a series of experiments for Air Materiel Command. The planes will be studied to determine structural damage sustained in water landings.

. . . **Cessna 195s** (designated as LC-126A-CEs) will be used by the Air Force for search and rescue work in Alaska. Cessna recently received a firm order for approximately $400,000 worth of planes and parts.

. . . **A new trainer,** the XT-30, is in mockup stage at the Douglas plant in Santa Monica, Calif. The experimental



Air Force model is single-engine, low-wing monoplane, powered by a Wright R-1300 engine rated at 800 h.p. on take-off. It will have a top speed of 286 m.p.h. at 10,000 feet.

. . . **A parachute "watch"** that eliminates use of the ripcord has been developed by the Swiss. A wire loop is pulled out automatically when the parachutist leaves the plane, activating a watch which begins ticking. A small sharp knife cuts the ripcord at any desired altitude (which is indicated previous to the jump by setting a dial).

. . . **First self-starter** for jets, developed by Navy and AiResearch Manufacturing Company, eliminates cumbersome storage batteries or heavy auxiliary power units outside the plane. Its major component is an 88-pound gas turbine, from which compressed air is bled to operate a high-speed turbine starter unit.

. . . **Production of aircraft** for the armed services should exceed 3,000 units in 1949, assuming no cutbacks in Air Force and Naval aviation programs, predicts Oliver P. Echols, president of the Aircraft Industries Association.

. . . **Two new jet bomber** projects are being pushed in Britain. Armstrong-Whitworth is reported working on an eight-jet flying wing bomber similar to the B-49; Handley Page is believed designing a four-jet swept-wing tailless bomber.

. . . **Piasecki XJP-1,** five-six place utility helicopter, is being tested at Naval Test Center, Patuxent, Md.

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A page of service tips for private flyers and fixed-base operators

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As an additional service, Standard Airport Dealers are offering flyers improved flight calculators. You'll find this accurate flying aid helpful in checking speed and distance traveled with allowances for temperature and altitude. Drop in to your Standard Airport Dealer for your calculator, soon. There's no charge, of course. And while you're there, ask about the "Ten point plan" by which Standard insures top ground service for your plane.

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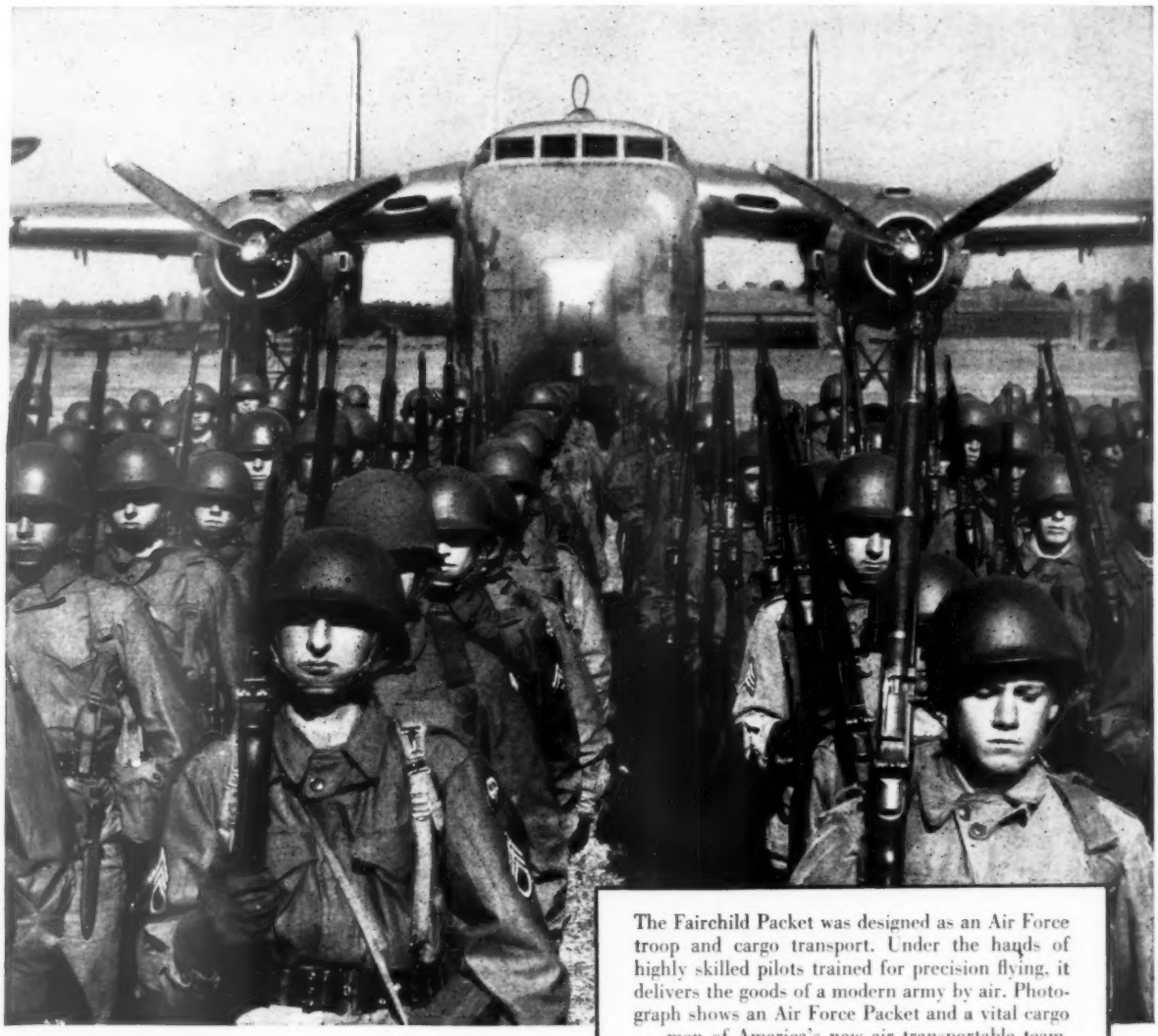

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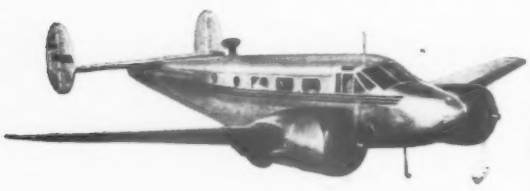

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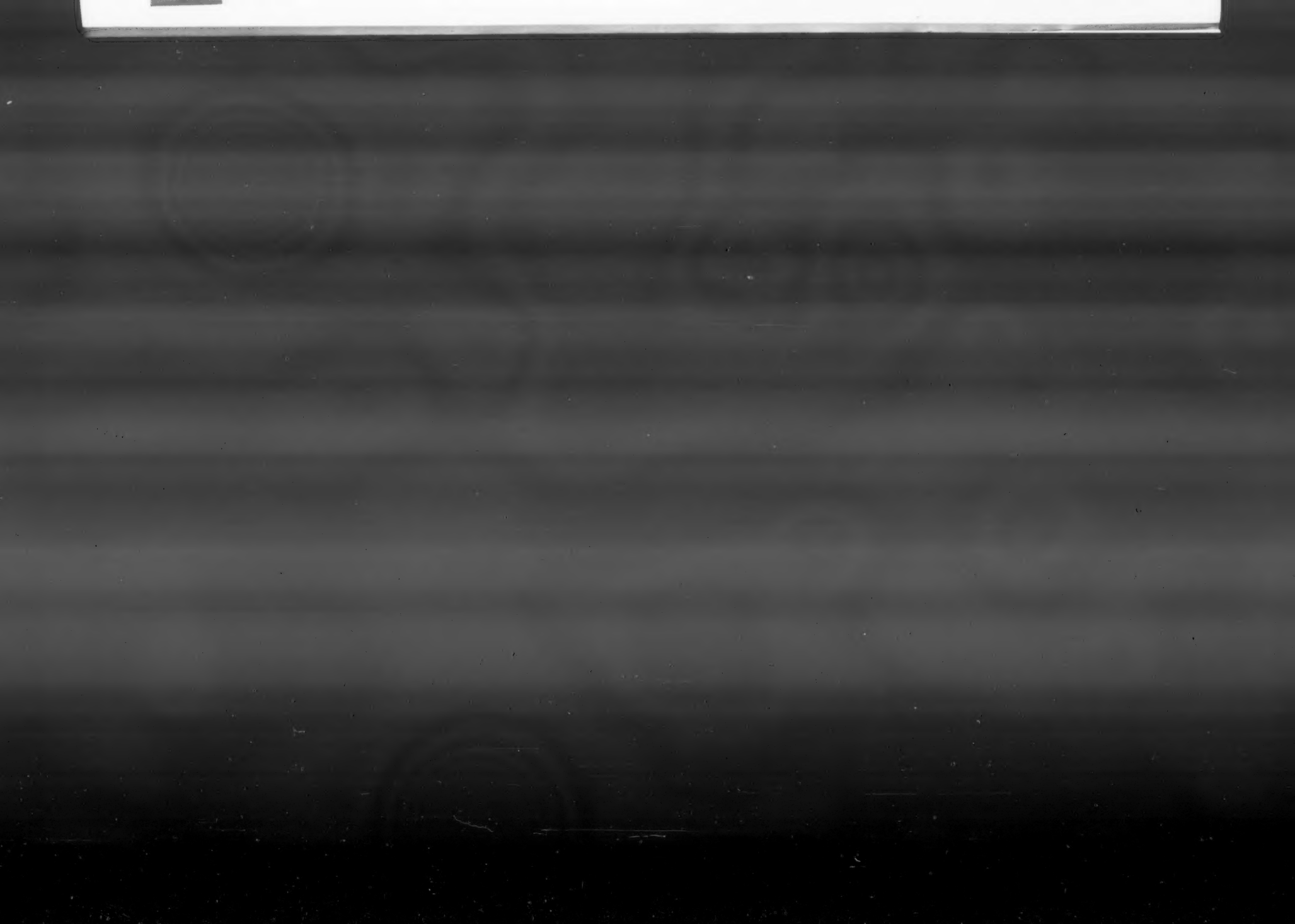
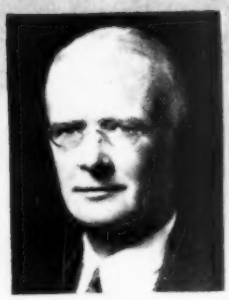


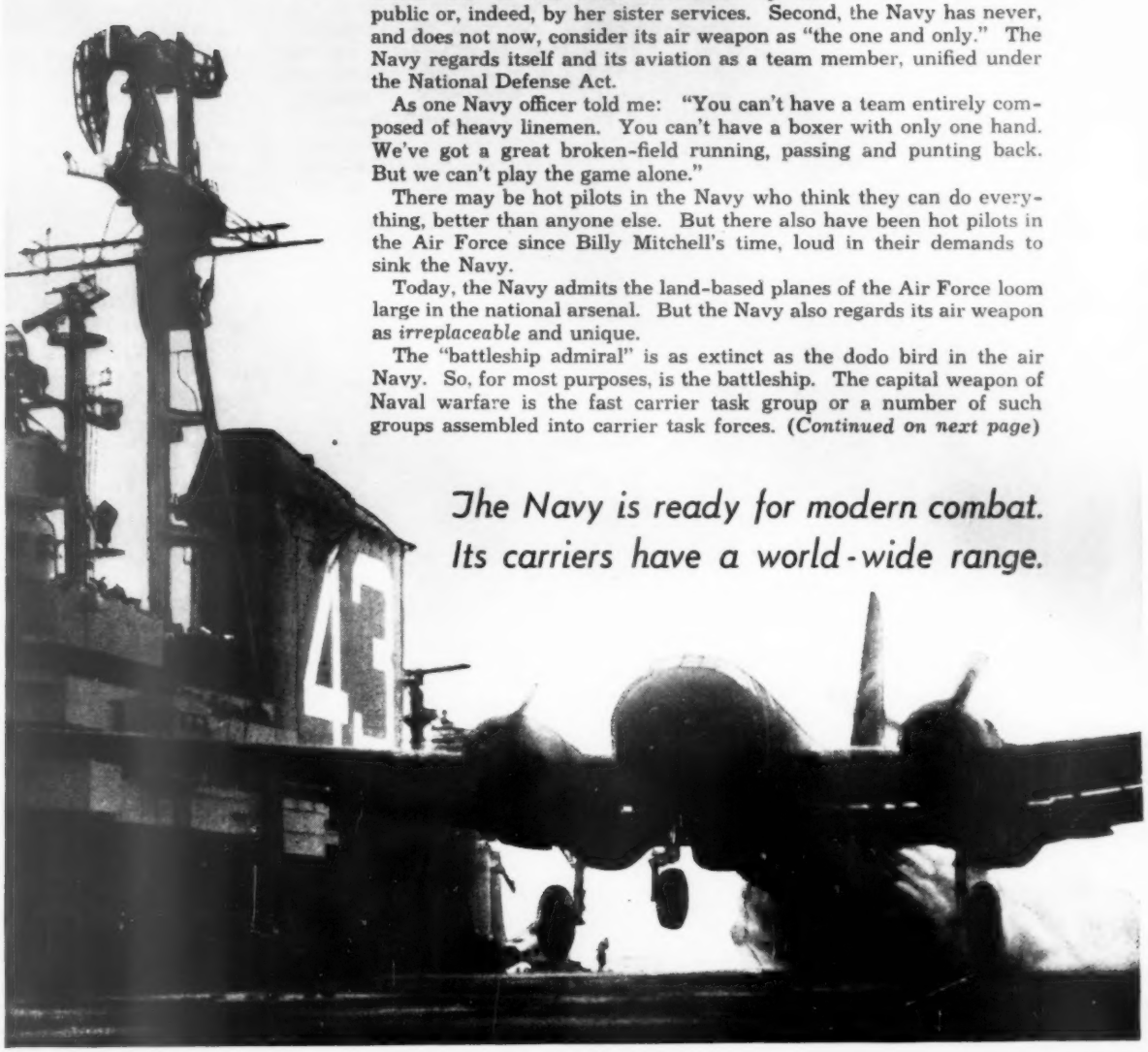
FLYING
FEBRUARY • 1949

THE CASE FOR THE AIR NAVY

By JOHN STUART



In 1910, John Stuart covered the flight of Glenn Curtiss from Albany to New York. Since then, he has written on almost all phases of aviation. He was FLYING's Washington correspondent in 1943, is now an aviation writer for the New York Times.



Largest plane ever to take off from carrier, Lockheed Neptune gets jato assist. Navy would use such long-range bombers when land bases were not available.

TWO THINGS should be weighed before discussing the place of Naval Aviation in the world today. First, Naval Aviation's role in World War II was little understood by the public or, indeed, by her sister services. Second, the Navy has never, and does not now, consider its air weapon as "the one and only." The Navy regards itself and its aviation as a team member, unified under the National Defense Act.

As one Navy officer told me: "You can't have a team entirely composed of heavy linemen. You can't have a boxer with only one hand. We've got a great broken-field running, passing and punting back. But we can't play the game alone."

There may be hot pilots in the Navy who think they can do everything, better than anyone else. But there also have been hot pilots in the Air Force since Billy Mitchell's time, loud in their demands to sink the Navy.

Today, the Navy admits the land-based planes of the Air Force loom large in the national arsenal. But the Navy also regards its air weapon as *irreplaceable* and unique.

The "battleship admiral" is as extinct as the dodo bird in the air Navy. So, for most purposes, is the battleship. The capital weapon of Naval warfare is the fast carrier task group or a number of such groups assembled into carrier task forces. (*Continued on next page*)

The Navy is ready for modern combat. Its carriers have a world-wide range.

The U.S. is the only country to possess that weapon along with proved and projected knowledge of its uses. Men in Naval uniform, from the broad stripes of flag command to the first rating patch on a jumper, know its unique heft and balance. They know its care and feeding. Above all, they know how to throw it. That's why the Navy's anger is deep when its weapon is belittled.

What, then, is this weapon? Essentially, each carrier task group includes four carriers of *Essex*-class or better, with from 30 to 40 escort vessels. One of the carriers would probably be of the new 45,000-ton *Franklin D. Roosevelt* class and three of the battle-proved *Essex*-type of 27,000 tons each. They cruise at the quarter points of a circle almost three miles in diameter and at better than 30 knots (upwards of 35 m.p.h.).

About a mile outside this circle are the battleships and cruisers—and current thinking is that such heavily anti-aircraft-gunned cruisers as those of the *San Diego* class are as good as battleships for this duty—with perhaps a few destroyers for fast maneuvering. From five to 12 craft are in this circle.

Still farther outside, three and a half miles beyond the cruisers, moves another screen of fast destroyers, destroyer escorts, submarines and special anti-submarine craft. They are capable of concentrating 15 or 20 ships at any point menaced, and of maintaining adequate guard at all other points. Few submarine skippers, however gallant, would want to try penetrating that screen.

And overhead, day and night, always moves the combat air patrol of reconnaissance and fighter aircraft, radar-equipped and capable of detecting and attacking air invaders before they get to the vital three-mile center.

Two or more such groups constitute a fast carrier task force. The U.S. alone has the ships to make up such forces. One of them is in commission today and the ships to compose three more are in mothballs.

A group can normally launch strikes of from 400 to 500 planes, made up of varying ratios of fighters, bombers and attack planes. A force can launch up to 1,500 such planes and keep a high proportion of them constantly in the air.

These planes have a radius of action (constantly being increased) of about 750 miles—1,500 miles out and back. Their bomb loads and armament are more or less secret. But it is known that vast advances have been made in both categories since the past war. Fast-firing automatic 20-mm. guns have been observed in the newest jet fighters. Rockets are bigger and more accurate. Bomb loads have been practically doubled. And it is reported that Navy attack planes now on carrier decks or soon to be there can carry the atomic bomb if needed.

At least one carrier air group is equipped today with jet fighters and more are on the way. The Grumman F8F, confidently described by the Navy as the world's fastest propeller-driven fighter, is the mainstay of the other ships. Already sufficient practice has been had with the jets to assure the Navy that they are as readily handled aboard ships as are their prop-driven predecessors. But the offensive power of the carrier task force is not confined to these planes—or to any airplanes. Experiments are well advanced in use of guided missiles launched at sea. The Navy pioneered in pilotless aircraft. It has already flown them on and off carriers.

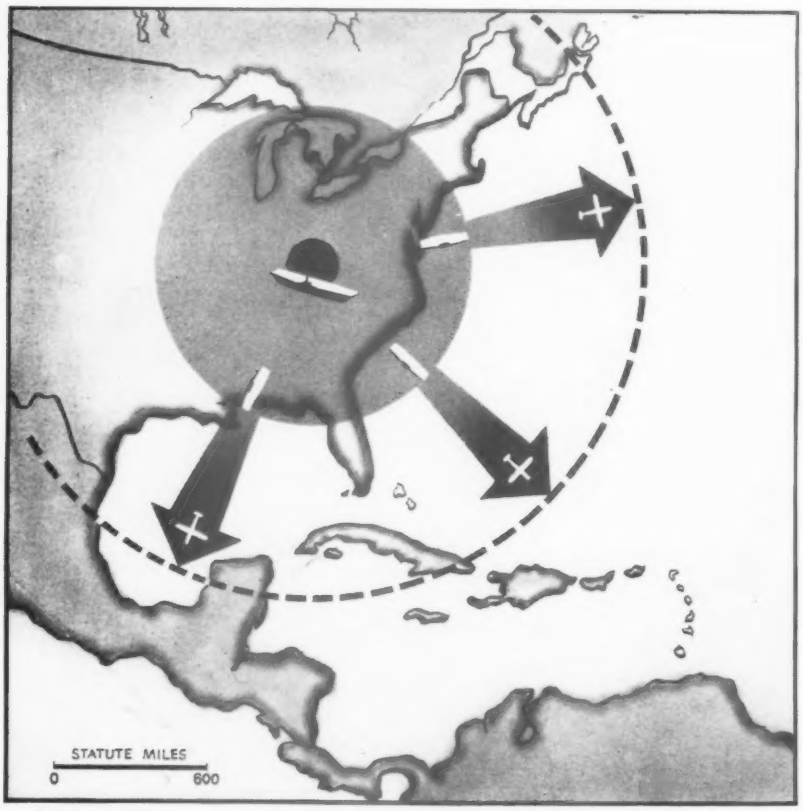
Vulnerable? Sinkable?

The record is that, once the fast carrier task force was formed toward the end of the Guadalcanal campaign, with the new battleships of the *North Carolina* class mated with the *Essex* carriers, no major carrier or other major ship was lost. And such forces met the only comparable forces afloat—the Jap fleets of battleships and carriers—and destroyed them. They lay inshore where enemy shore-based and ship-based aircraft outnumbered them as much as 10 to 1. And they destroyed both land-based and carrier aircraft—and much else. They won control of the air and sea, and in the end they lay in close and pounded the last defenses of the Japanese home islands.

Today their immunity to attack has been tremendously enhanced. Such a force can now throw into the air no less than 200 tons of antiaircraft metal per minute. Concentrated upon the few paths a plane or missile can follow to make an effective hit upon so small a target as a ship, it makes an impenetrable umbrella.

This isn't theory. At the "Saipan turkey shoot" of 1944 such a force provided air cover for the landing troops and, with its left hand, beat off a full-scale Jap Naval attempt to interfere with the planes and surface vessels. The Jap effort was all out. With the fall of Saipan, the Tojo cabinet fell.

Less than a year later, at the Second Battle of the Philippine

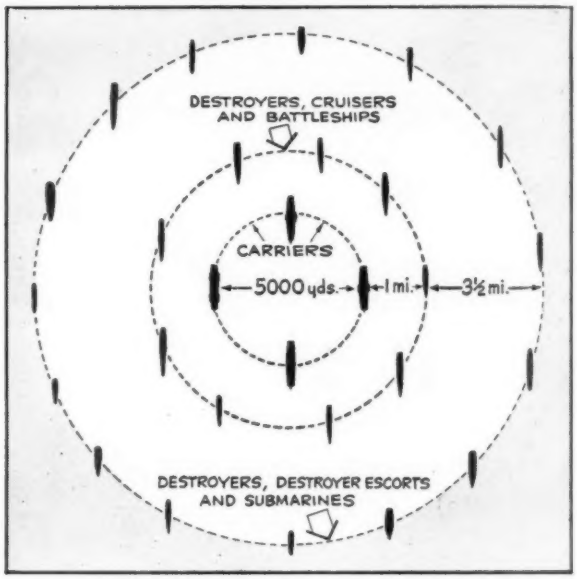


One day's range of carrier force is charted over U.S. map. In 24 hours, carriers starting at center could be anywhere in area large as dark circle. Planes could fly to dotted line.

Sea, the same forces drove the whole Jap Navy from the scene, sending it to lie crippled for the rest of the war in home harbors. Striking here and there, it destroyed Jap land-based planes in the Philippines, permitting the MacArthur landings to stick and to move on. Thereafter, it assisted in the reduction of Okinawa and Iwo Jima, which provided fighter bases for the B-29 attacks on Japan.

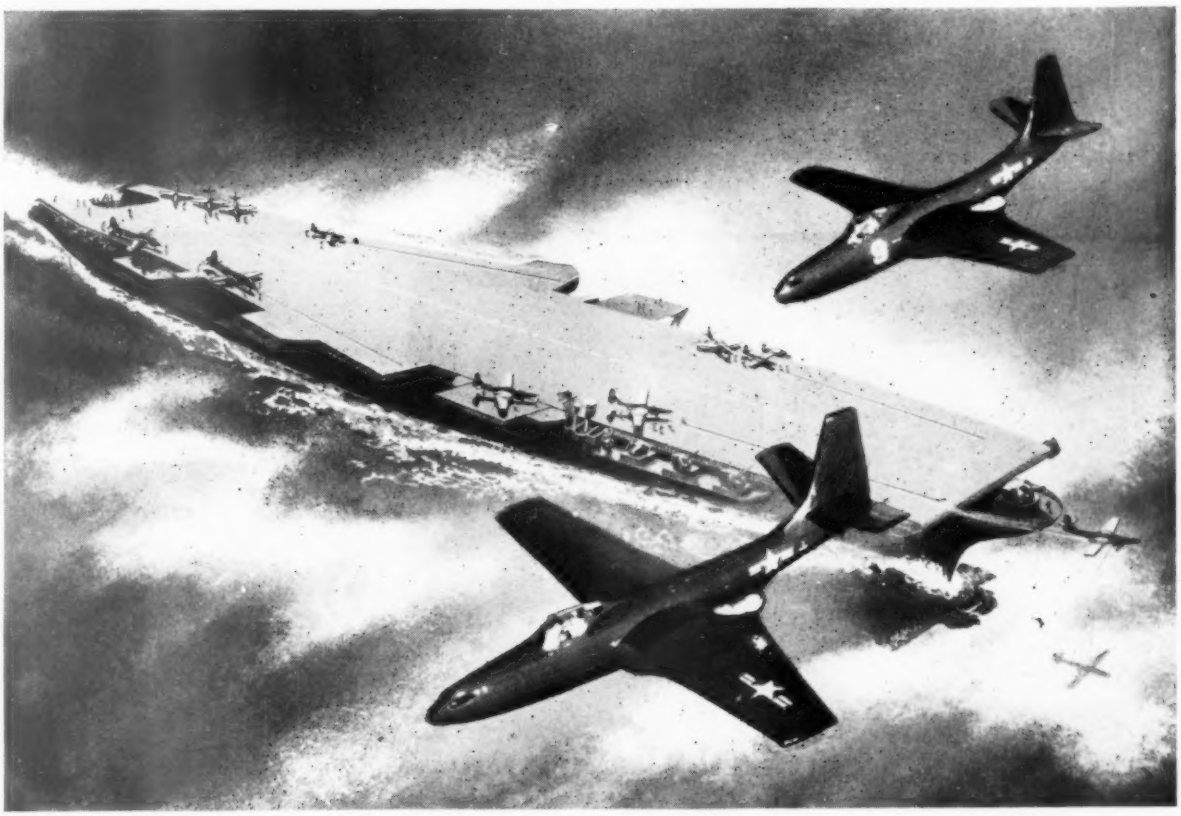
In the Pacific the fast carrier task force met and beat a guided missile which, Naval men say, will never be exceeded in effectiveness by any automatic device. For the Jap *Kamikaze* plane was a missile, guided to its ultimate destructive end by a human brain, a pilot consecrated to death. Against the new counter measures already available, it seems certain that no new mechanical guidance will ever be as good as that. The Navy set its goal as the destruction of 90 per cent of the *Kamikazes* which plagued it off Okinawa and in the roadstead of Karama Rhetto where Admiral John Dale Price's PBMs and *Privateers* operated closer to the enemy homeland than any other force. In the last two weeks of the war there were 141 *Kamikaze* attacks. Every one of them—100 per cent—was shot down before it got home. Previously, the *Kamikazes* had not been able to sink a single carrier or other major ship.

So, says the Navy, bring on your guided missile, even if it has an atomic warhead. This confidence is based on experience. It should not be forgotten that a Naval officer, Rear Admiral, then Captain, William S. Parsons, touched off the atomic bomb that fell on Hiroshima. Rear Admiral Ralph A. Ofstie is the Naval member of the military liaison committee to the Atomic Energy Commission. He is the man who conducted the experiments at Bikini. It is to be safely assumed that the Navy planners know everything that is to be known about the effectiveness of atomic bombing. Their estimate is this:



Carrier task group includes four carriers with from 30 to 40 escort ships. Planes overhead add to formidable defensive screen.

If any nation were foolish enough to waste an atomic bomb—still a rare and costly weapon—on a fast carrier task force which is properly (*Continued on page* 72)



Proposed 65,000-ton carrier (the CVA-58) will be 1,090 feet long, or 130 feet longer than Midway class carriers. Artist's conception shows how flush deck gives additional space. Including temporary structures that can be hinged up or down, maximum width is 236 ft.

What Really Happened

Manila burns after Japanese attack. Because of early destruction of U.S. Air Forces, little defense was possible against enemy bombers.

☆

Key figures disagree on responsibility for fiasco at Clark Field, primary U.S. Army Air Force base in the Philippines

☆

Lieut. Gen. Lewis H. Brereton:

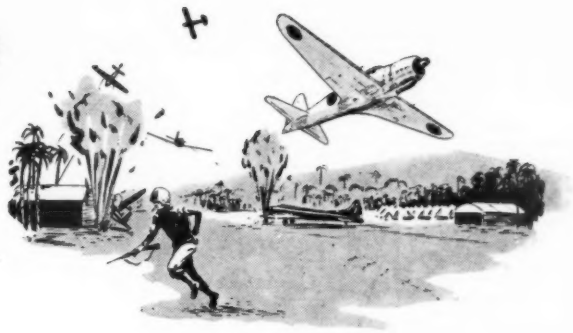
. . . Sutherland instructed me to take no offensive action against Formosa until ordered by General MacArthur. . . .

Lieut. Gen. Richard K. Sutherland:

. . . The responsibility for holding the planes on the ground that morning was entirely Brereton's. . . .

at Clark Field?

We had plenty of warning, yet the Japanese caught and strafed our bombers on the ground. Why?



AMERICAN FORCES, in the Philippine Islands were not ready for war by December, 1941, but they were well aware of the threat of war. Preparations were going forward in accordance with a plan to hold the islands against enemy assault. Army air units, organized into the Far East Air Force under Maj. Gen. Lewis H. Brereton, had a total of some 8,000 officers and men and more than 300 aircraft, concentrated largely on the island of Luzon.

General MacArthur regarded air defense of the islands as seriously deficient. He had urged prompt action to provide additional aircraft and equipment for an adequate aircraft warning service. His command had been scheduled to receive before the end of November a light bombardment group equipped with 52 A-24s and a heavy bombardment group with 26 B-17s. Out of an anticipated production in the United States of 220 heavy bombers by the end of February, 1942, 165 had been scheduled for delivery to the Philippines.

By November 22, AAF officials warned that all available heavy bombers and pursuit planes destined for the Philippines should be en route not later than December 6. This hope was not fulfilled.

The Far East Air Force had begun to take precautionary measures early in November. General Brereton ordered all post, group, and squadron commanders to be prepared for any emergency. Special instructions to tactical units emphasized the need for operational readiness. Aircraft were to be dispersed to minimize the effects of an aerial attack. Crews for all aircraft in commission were to be placed on "two-hour readiness" call day and night. The 19th Bombardment Group (H) was ordered to have one squadron prepared at all times for reconnaissance and bombing missions, while the 24th Pursuit Group was to keep a three-plane flight from each squadron on the alert from daybreak until dark. These orders were in effect by November 10. Five days later, all pursuit aircraft were placed on constant alert, fully armed, and with pilots on 30-minute call. The War Department on November 27 warned the Command of possible hostilities.

Despite the modern equipment of most of the pursuit squadrons and their apparent readiness for action, the total system of air defense in the Philippines had not reached a satisfactory stage. Aircraft warning service and the antiaircraft defenses were sadly inadequate. Only two radar sets were in use at the time of the attack.

Air patrols reported large numbers of Japanese ships early in December in harbors and at sea, confirming the

Gen. Douglas MacArthur:

. . . I received no recommendation from Brereton to proceed against Formosa, nor did I know anything about such a recommendation.

Col. Harold L. George

. . . He took necessary steps to provide pursuit protection for vital points against approaching Japanese bombers: . . .

Maj. Gen. Eugene L. Eubank:

. . . Information of the Japanese formation which attacked Clark Field was not received by the Bomber Command prior to the attack. . . .

general assumption that a major move was afoot. Japanese aircraft were also noted in flight, but no American planes were attacked.

The Japs had flown reconnaissance missions over Luzon from Formosa during the last week of November. Apparently the Americans did not know of this activity prior to December 2, when a "hostile" aircraft was sighted over Clark Field at approximately 0530 hours. During each of the next three nights a plane was detected, but attempts at interception failed. By December 6, General MacArthur had established a final alert. All stations were manned and the number of guards increased, special precautions had been taken against sabotage, and all aircraft were dispersed as best they could be, each of them under constant guard.

For defense of the Philippines, the Far East Air Force had in commission 33 B-17s (16 at Del Monte and the rest at Clark Field) and approximately 90 pursuit aircraft. The 3rd Pursuit Squadron at Iba and the 17th at Nichols each had 18 P-40Es; the 20th at Clark was equipped with 18 P-40Bs. The 21st and 34th Squadrons, respectively based on the Nichols and Del Carmen Fields, had arrived in the Philippines only in late November and did not receive their planes until December 7, when the 21st was assigned approximately 18 hastily-assembled P-40Es and the 34th took up its duties with P-35s, each of which had an average flying time close to 500 hours. Also available were a miscellaneous assortment of noncombat aircraft and 12 P-26s flown from Batangas by pilots of the Philippine Air Force.

THE ARMY AIR FORCES IN WORLD WAR II

This is the second of two articles condensed from Volume I of "The Army Air Forces in World War II." The seven-volume history is being prepared under the editorship of Wesley Frank Craven, New York University, and James Lea Cate, University of Chicago, by the Office of Air Force History. This article is based on Chapter 6, by Richard L. Watson of Duke University. The University of Chicago Press will publish Volume II in May.

Had the Japanese been able to keep to their schedule, the attack on the Philippines would have coincided much more closely with that at Pearl Harbor. But inclement weather above Luzon prevented an early morning attack, and gave the Americans advance notice of several hours. In fact, the major attack on Clark Field, where virtually half of our total bombing force was destroyed on the ground, did not develop until after noon, some nine hours following the initial bombing of Oahu.

In the Philippines, which lie on the other side of the international date line, it was Monday, December 8, when shortly after 0300 (0830 in Hawaii) a commercial radio station picked up a report of the Pearl Harbor attack. Though official confirmation was not immediately available, base commanders received prompt notification and all units were placed on combat alert. Within 30 minutes of this first warning, the radar set at Iba plotted a formation of aircraft about 75 miles offshore headed toward Corregidor. The 3rd Pursuit Squadron immediately sent out planes for interception but they failed to make contact. There were no other alarms prior to receipt of official confirmation of outbreak of hostilities by 0500.

A plan of action which had been considered for this eventuality by the Far East Air Force was an American air attack against Formosa, the natural point of concentration for a Japanese invasion of the Philippines. Objective folders, although without calibrated bomb target maps or aerial photographs, had been prepared, and Col. Francis M. Brady, chief of staff to General Brereton, promptly took the initial step toward mounting the operation by ordering the B-17s at Clark Field prepared for the mission. Brereton himself reported at about 0500 to General MacArthur's headquarters at Fort Santiago, where he requested permission of Brig. Gen. Richard K. Sutherland, chief of staff, to carry out offensive action as soon as possible after daylight.

That request, unhappily, has become a subject of controversy. Conflicting statements have been made. Only a few fragments of the official records of the Far East Air Force survived, with the result that chief reliance must be placed on the recollections of its personnel.

Since the question turns so largely on evidence drawn from memory, it seems pertinent to observe here that there can be little doubt that to the airmen of General MacArthur's command the logical defensive use of the long-range bomber in the circumstances was to strike at the enemy's concentration of air and naval power on Formosa, and to strike before the enemy could attack. This was in accord with standard AAF doctrine and with the mission of the B-17. The mission presumably would serve useful purposes of reconnaissance, and it would have been in accordance with the recent revision of the basic war plan, RAINBOW No. 5.

If General Brereton did not propose an early undertaking of offensive action against the enemy on Formosa, as both officially and publicly he has stated he did, it would be surprising indeed.

Following the publication in 1946 of "The Brereton Diaries," in which for the first time General Brereton publicly stated the facts as he recalled them, General MacArthur announced that he had received no such recommendation and that prior to that publication he knew "nothing of such a recommendation having been made."

This statement lent special weight to the testimony of General Sutherland, who during the preceding year had stated that the responsibility for holding the bombers on the ground that morning was entirely Brereton's.

It was Sutherland's recollection that the air commander agreed that there would be no point in attempting a bomber mission without ad- (*Continued on page 62*)

FORGOTTEN WEAPON— The Atom Bomb

By Col. DALE O. SMITH

ATOM-WAR STRATEGIST

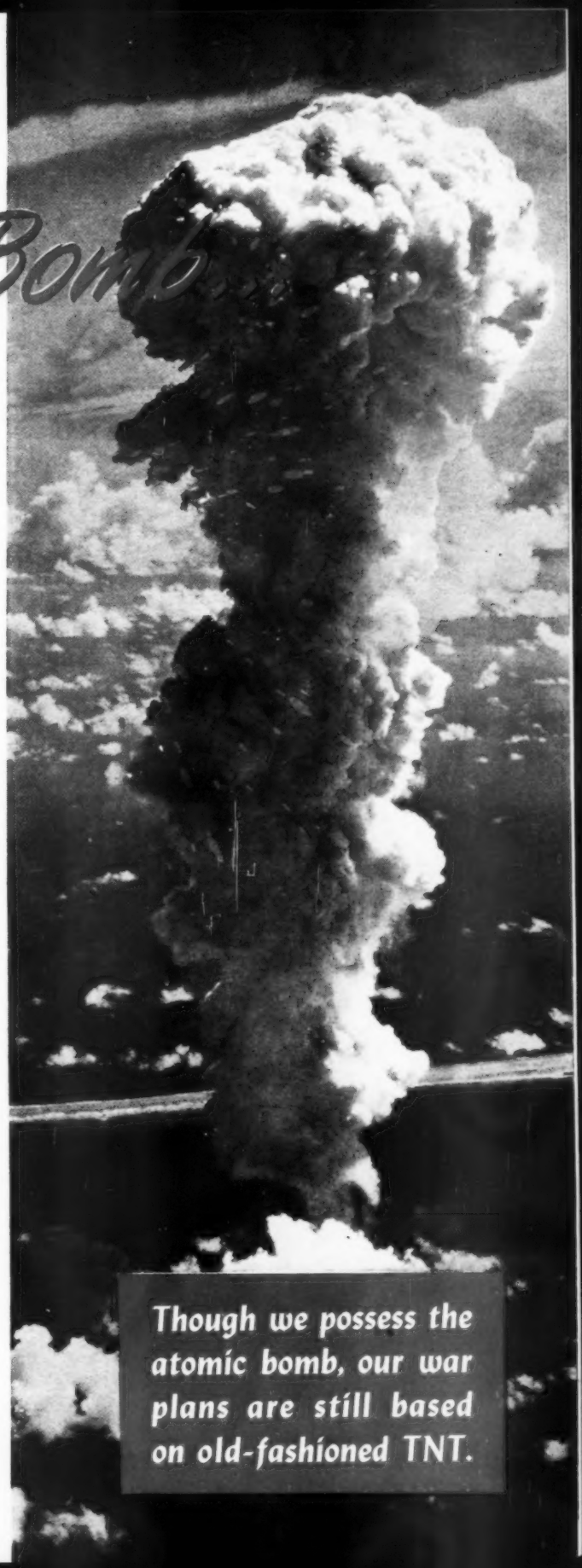
Excited controversy has been aroused by this significant article, originally published under the title, "Operational Concepts for Modern War," in the Fall issue of the Air University Quarterly Review. Colonel Smith, now studying at Stanford University, was formerly chief, Research Division, The Air University. He was commanding officer of the 348th Bomb Group, 8th Air Force, and chief, Bombardment Requirements, A-3, Hq, AAF. His views do not necessarily coincide with the official views of the Department of the Air Force; of Headquarters, U. S. Air Force, or of the Air University itself.

THE OPERATIONAL doctrines for fighting a modern war are in need of drastic revision. We cannot hope to expend our efforts and resources to greatest advantage until we decide just how we intend to fight a modern war. We talk about modern war, but our plans indicate we expect a repetition of the past conflict. A revolution in weapons calls for a revolution in tactics. Traditional concepts of operations must only be followed insofar as they can be applied to best exploit our new weapons.

Traditional warfare has usually been a contest of strength between armed forces. Once one army or navy destroyed its opponent, national victory was generally assured. The Punic wars, the Napoleonic wars (excepting the invasion of Russia), the American Civil War, and the Franco-Prussian War were all fought on this order. In fact, most of history's wars were thus decided. Exceptions to this traditional form of warfare were found in the siege, where one side took the defensive and the other simply invested the enemy fortress or nation until it was starved into submission.

Another type of warfare can be found in what we now call psychological warfare, which consists of employing any means other than armed conflict to weaken an enemy's will to resist. This form was greatly responsible for the victories of Alexander the Great. His unorthodox but highly successful phalanx tactics spread exaggerated fear. More recently, the invasion of Austria by Germany (the *Anschluss*) falls under this category.

The present concept of war calls for the concurrent em-



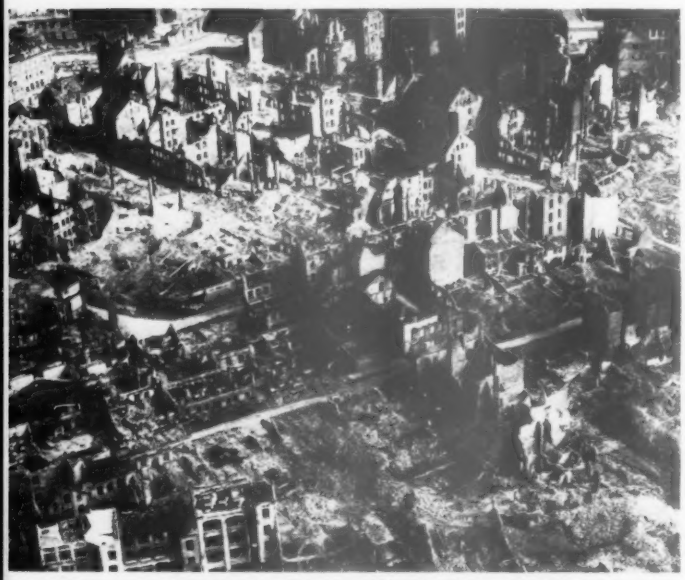
Though we possess the atomic bomb, our war plans are still based on old-fashioned TNT.

The Convair B-36 is world's longest ranging bomber. Its 10,000-mile range makes it capable of delivering an atom bomb upon any likely target on earth from U.S. bases. It can operate at high altitude.

ployment of combat, siege, and psychological tactics.

Economic warfare is simply one means of tightening a siege and reducing enemy combat effectiveness. Political warfare, subversive activity, and the coups of modern power politics are examples of psychological tactics. Strategic bombing is a tactic primarily of siege warfare, although it has combat and psychological ramifications—combat, through its effort to secure air superiority, and psychological, because of the terror associated with bombing. Bombardment of an enemy heartland, when done in force, not only effects a siege, but accelerates its crisis. Transportation is not only disrupted to the point where even food cannot be distributed, but all elements of the national economy are severely damaged in a short time. There is no waiting for the economy to run down to where national reserves are consumed, as in surface siege. There need be no fear of an enemy sustaining himself over a protracted period through self-sufficiency. Air bombardment destroys not only much of the reserves, such as oil, steel, and manufactured goods, but the means to use the reserves, such as transportation, communications, and power. It does more than simply destroy war potential; it kills the nation.

The effectiveness of siege by bombardment was amply demonstrated in World War II. By late autumn of 1944 the entire German industrial complex was beginning to crumble, and all post-war surveys show that she could not have survived as a nation even though her land offensive in the Ardennes had been fully successful. Numerous experts have further stated that she would have fallen without an invasion. In the Pacific, siege by bombardment and sea blockade resulted in Japanese collapse prior to large-scale combat. The decisiveness of air siege has resulted in its becoming the primary tactic of modern war.



Germany was devastated by tons of TNT bombs after years of pounding. An atomic air blitz could end a future war in a month, author says.

Yet the concept of strategic bombardment (or air siege) is nevertheless still open to some question. A long history of wars won primarily through open combat between armed forces prevents our discarding the combat concept entirely. Furthermore, the last war was not won solely by air siege, but by a combination of siege and combat. Even though the air siege is generally considered to have been the most decisive factor, there remains a doubt in many minds that it would have been decisive without the support of surface combat. Indeed, air siege would have failed without air combat and without surface combat for air bases.

In World War II lengthy build-up and operational periods were necessary to realize the effectiveness of air siege. Approximately 2½ years were necessary to create the air power and its logistical support before effective air siege could be commenced. During this build-up period combat between conventional forces was naturally the order of the day. Orthodoxy held sway because the wherewithal to conduct air siege was lacking. Once large-scale bombing began, the limitations of air power's destructive force necessitated "sustained" operations—repeated attacks to destroy a system of industry that could not be fatally damaged on one operation and that could be repaired between attacks through the use of other industrial systems. It was a race between destruction and rebuilding, with the edge only slightly in favor of air power. The bold claims of air leaders that the enemy would be quickly subjugated by air attacks were not confirmed. The enemy fought on tenaciously.

Economists reasoned that if one key target "system," such as the ball bearing industry, could be cut out of the enemy nation and could be kept demolished through sustained operations, it would cause the collapse of a wide portion of other industry which was dependent upon the key product of the destroyed system. This theory was practiced but not proved. Target systems were often changed before any one system was significantly damaged. U-boat repair and construction, aircraft engines, air frames, ball bearings, oil, and transportation were a few of the major systems attacked by the AAF over Germany.

The RAF generally attacked urban areas in an unsuccessful psychological campaign, although the attendant results of RAF bombing on all (*Continued on page* 68)

HIROSHIMA →

The "little bomb" at Hiroshima devastated the darkened area shown in circle, above, right. Of 17 military objectives in area, seven were 100 per cent destroyed and all but one were at least 25 per cent destroyed.

A similar "little bomb" would pulverize the area of New York City pictured within the circle below. And today, atomic bombs exist many times as powerful as our Air Force dropped upon Japanese Hiroshima.

↓ MANHATTAN

All-freight lines such as Slick Airways are opposed by certificated carriers, who say rates were lowered too quickly for good of industry.

The Battle of the Airlines

By ESTHER H. FORBES

Associate Editor, Payload—The Air-Freight Newsletter

Passenger and freight revenue is the prize, as certificated airlines fight the U. S. non-skeds.

AIRPLANE coach travel at rates comparable to railroads is a reality today. But it is also becoming the center of a furious battle. Seeds of that battle were sown at the end of the war when the pent-up demand for air transportation could not be met by existing airlines.

Seeing a way to put war-learned skills to profitable use, veterans of the Army and Navy air transport services all over the country formed small airlines for charter transportation of people and goods. Without previous business experience in transportation, many failed. But those who survived evolved a philosophy which, if encouraged by the Civil Aeronautics Board, may herald a new era in commercial air transportation.

This new philosophy conceives of air transportation simply as a quick, convenient way of carrying people and property from one place to another as cheaply as possible. Its proponents seek to eliminate glamour and make air transportation purely utilitarian. By applying mass production methods to airline operations they have cut costs to a point where they believe the airplane can be used as a necessity rather than an infrequent luxury.

Secret of their operations is simplification and specialization. Whereas established airlines cater to all types of air traffic—passengers, mail, express and freight—the successful newcomers specialize in just one type—either passengers or freight. More important, they concentrate on only a few cities and routes, where traffic is heaviest.

The new passenger airlines have done away with frills provided by the older certificated airlines. They don't maintain expensive reservations facilities, operate individual ground services, or offer free full-course meals during flight. Instead, they receive all bookings through travel agencies, paying a commission of 10 per cent to 25 per cent; this saves them a substantial sum in indirect costs, yet enables the agencies to make a comfortable profit. Similarly, they contract with specialists for their ground handling services. In Newark, for example, Consolidated Air Service performs ground handling for five different airlines, checking in passengers, giving ramp service, and loading and unloading baggage. They serve

only coffee and sandwiches in flight, passengers buying their own meals at airport restaurants en route when necessary. Since the planes fly mostly at night, hearty meals are usually not required.

With such economies the coach operators say they are trying to bring air travel within reach of the average American working man. But such has not always been their aim. The first lines which began flying at the end of the war were formed frankly to exploit the huge demand for air transportation which the existing airlines could not meet. Accordingly, they set themselves up as charter operators, using war-surplus planes with bucket seats and flying whenever they had a big enough load. Though service was below par, they could pretty well dictate their own price, charging whatever they could get.

Actually it was not until the end of 1947 that today's air-coach service was born. Passenger business had slumped badly while costs had gone up. The scheduled airlines were losing money, and many charter lines had been forced into bankruptcy. Airline managements everywhere were looking for some way to get back in the black. Certificated airlines, thinking only in terms of existing operations, had decided to ask for higher mail pay, higher fares. But the irregular carriers, with no mail contracts, were not so sure that higher rates would do the trick. Higher rates, they feared, might reduce the demand for their services still further.

As they saw it, the only way to stay in business was to cut their rates sufficiently to open up new markets—and the only way to cut rates was to reduce indirect costs. Accordingly, just before Christmas the transcontinental carriers, led by Edward Ware Taber's Sky Coach line, came out with a new type of service, similar to that available by rail coach. Operations were simplified, and the fare from New York to Los Angeles slashed from $136 to $99.

Reservations soared, and before long planes were taking off regularly with all the seats filled. Passengers did not care that the planes were the comparatively slow DC-3s, that seats were placed close together to accommodate 28 persons, and that no meals were served. Most of them were traveling by air for the first time.

Volume shipments, including such unusual cargoes as cattle, constitute the main business of non-certificated all-freight lines.

Meanwhile, another group of airlines—the now-famous all-cargo operators—had already introduced second-class air transportation of property. Like the passenger lines, the all-cargo lines had sought to take advantage of the urgent post-war demand for quick transportation—in this case, of goods in short supply which were needed on assembly lines or in shops. But they also wanted to build for the future. The only cargo service generally available was air express, with rates so high that it attracted only small or emergency shipments. They saw a permanent need for a service similar to rail freight. Their theory was that many businesses would find distinct advantages in shipping by air but did not need air express service. By offering a slightly slower service and specializing in volume shipments, they reasoned, they could establish air freight rates which would make (*Continued on page* 65)

Pan-American started air tourist service between New York and Puerto Rico in September. Fare is $75 (40 per cent below regular rates) and business is booming. DC-4s, used on the run, seat 64 passengers instead of the regular 52, and only box lunches are served.

A REPORT ON THE CIVIL AIR PATROL

By BOB ARENTZ

THE CIVIL AIR PATROL is an enigma. It is an important auxiliary to the air arm of the United States and has vast potentialities. Some of its wing commanders and staff officers rate among the best pilots in America. Scores of CAP pilots, including a high-ranking colonel of the Air Force, have given their lives in plane crashes on official duties.

A growing number of ex-G.I.s, former combat pilots, and newly made private pilots have transformed the once-thin ranks of CAP into a new and vital organization in many states. Some wings of the Patrol have rendered invaluable service.

Yet elsewhere the CAP has been a political football, manned in strict protocol of political patronage and staffed with pompous civilians. In isolated instances, wing officials not only can't fly but are afraid of airplanes. In October, the American Legion passed a resolution recommending against continuing Air Force funds for the Patrol. The National Aviation Clinic and the Air Reserve Association, on the other hand, have endorsed the Civil Air Patrol and the organization has many other influential supporters.

With instructions from FLYING's managing editor to "find out what has been wrong in the past and how things will be better in the future in CAP," I extended an informal survey from coast to coast between July and No-

The American Legion condemned the CAP as a 'waste of money.' Here's the truth about an important AF auxiliary.

Surplus trainer assigned to Utah wing won't fly but is used for ground training classes at Salt Lake City.

vember. This varied from a seven-state unofficial tour on other business (in a Globe *Swift*) through semi-official junkets in four states formally questioning for CAP data. It included a highly official visit in Washington headquarters at Bolling Field.

My personal conclusions are these:

1. The CAP is an important auxiliary to the Air Force.
2. It will be continued, and from all indications will grow and become more efficient within the foreseeable future.
3. The Patrol is dogged by state politics and rank-happy civilians, with a particularly gloomy picture in at least a dozen states, and a questionable situation in two dozen more.
4. About 12 states now have first-class organizations.
5. Some of the best members, who quit after the war in disgust, are returning to CAP. The personnel situation is altering so rapidly that not even national headquarters knows how many active members are in the CAP today.

Historically, CAP was organized December 1, 1941, under the Office of Civilian Defense to mobilize civilians and their airplanes for wartime "duties." Its original concept, apparently, was to control civilian flying and to utilize available civilian planes to replace Army aircraft on essential missions. It soon outgrew those limitations. In October, 1942, a cadet training program was founded to build up a reservoir of trained personnel for later Air Force service. On April 29, 1943, CAP was transferred to the War Department.

With the exception of headquarters personnel, a USAF-CAP liaison officer, a sergeant and a secretary at each state wing, all members are non-paid volunteers. A wing commander in each state and territory directs all activities under his wing. He, and all other CAP personnel, hold honorary commissions or enlisted ratings. Most wing commanders hold the honorary rank of colonel. Wings are organized in groups, squadrons and flights. A squadron may have from 10 to 200 members.

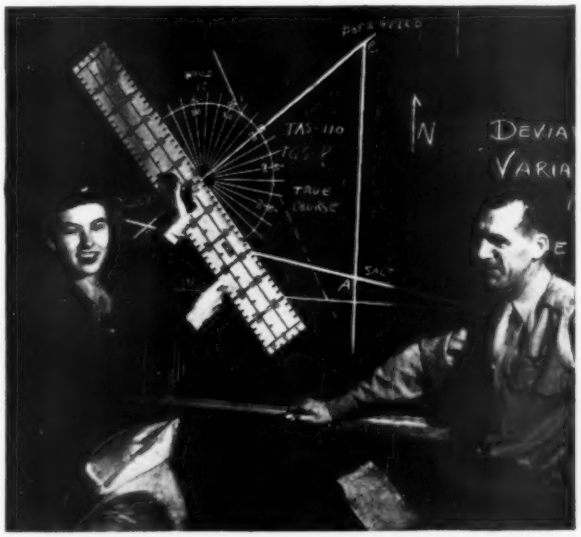
Current membership is between 75,000 and 125,000 persons; and while a tally might show 170,000 names on file, a lot of them haven't attended a CAP meeting in 18 months. Members are classified as seniors and cadets. Cadets must be between 15 and 18 years old and may join simply by getting application blanks at squadron, wing, or national headquarters and submitting them according to instructions. Senior members include both non-commissioned personnel and honorary officer personnel, a situation that has caused a lot of trouble in the past, when CAP participated in official Air Force search and rescue missions. The rank, though honorary, establishes the military protocol once a search plane has landed at a military base and civilian flying partners participating in air search work are sometimes separated for meals and necessities under aggravating circumstances. Many members advocate elimination of all rank as long as CAP continues as a strictly volunteer civilian group. It seems to depend on just how much rank an individual holds—the colonels disagreeing violently.

Selection of officers in some wings has been capable and efficient. Organizations theoretically pick men who are capable of contributing information, intelligence and ability for the good of the squadron, group or wing. Two western wings have become widely known as "rich men's flying clubs," although all appointments and promotions are approved by national headquarters.

A private license and a demonstration flight are legally sufficient to give any member the status of CAP pilot. Flyers with 200 hours of solo time are permitted to carry cadets as passengers in CAP aircraft, which at the present time are L-4s on assignment from the Air Force. While national headquarters was trying (*Continued on page* 67)

CAP flight training includes all types of aerial work. Here, three members of a Utah unit prepare for photographic mission.

Infantry drill is a required subject. Squadron members also study manual of arms, guard duty and military correspondence.



Navigation and flight courses are given in training sessions. Squadron meetings are held at night, once or twice each week.

"**Wupps, excuse me,**" she said. "I did not mean to break in on your privacy."

The Pilot Takes a Physical

By HY SHERIDAN
Captain, American Airlines

FLYING columnist writes a pilot's description of 'Inside Sheridan,' or 'What the Flight Surgeon Saw.'

CARTOONS BY DICK SHAW

THERE CAME A DAY when the airline notified me that I should bring my cells, in which I am unfortunately confined, to the company flight surgeon for an inventory.

Ordinarily I am as robust as anyone could wish, glaring at traffic cops and leering at high-school girls and never eating the breakfast of champions for the very good reason that I don't need it. But somehow or other when I get one of those letters to see the company flight surgeon my beer just turns to water. I squint at the lettering on a distant box car and worry like hell when the Chicago, Milwaukee, St. Paul & Pacific turns out to be the Erie. I run upstairs and notice my pants (respiration, silly!) and I try to keep from breathing hard. For three days before I have to appear I give up smoking and drinking and singing. This is an ordeal, believe me, and, taking a purely objective view which I am able to do between examination periods, I am afraid that I go into the flight surgeon's rooms pretty well exhausted from the privation.

For at least three nights previous to my role as a guinea pig I go to bed early and toss for hours, although I know perfectly well that it is not good to lie alone half the night and toss. I think that I am on sound ground when I suggest that the guinea pigs themselves do not do this.

While preparing for the examination I had an inspiration which surprised me very much. Usually I get my inspirations at Kelly's Ego Repair Shop but this one came upon me without any priming at all. Since it is a poor rule that doesn't work both ways I determined that while the flight surgeon was examining me I would examine him. If I could get his mind off me and onto him my examination would no doubt come out better because a man naturally thinks highly of himself. I knew that he was going to get a good deal out of me in one way or another, as surgeons have a way of doing, so I determined to get something out of him, to wit and viz, a story. He would get his innerview and I would get my interview.

People often wonder why the airline companies require that their pilots go to company flight surgeons when the

pilots are made to go twice a year to perfectly good Government ones. Personally I think that the reason for this procedure is educational, because the managements don't get to see the Government medical records. When it is a company flight surgeon who asks the pilot how his love life is the material is not entirely wasted, as the saying goes. At any rate the airlines keep flight surgeons and I was going to see one.

His name is William Lawrence DeRenne, M.D., Flight Surgeon. And he is a mighty good one, being one of the most thorough scientific peeping Toms in the business—if it is a business. (He goes over the stewardesses, too.) Dr. DeRenne is a tall, rather handsome fellow who supports a tenacious mustache all of the time and a learned expression when the occasion demands. He is also a psychologist of parts—whatever parts you have. Why, he can get psychiatric information from how you trim your toe-nails or how you sit down.

The day of my one-man parade arrived and, wishing to make a good impression, I took a bath. I put on a little talcum, which I seldom do except in case of emergencies, but only a little, judging the amount with care so as not to be mistaken for anything but a gentleman. The talcum helped calm me, too, mother having put it on when I was quite young.

I drove to the airport and soon I found myself standing before the door to the various chambers that the doctor uses for his rites. I put on my most hearty manner, squirting vitality at every pore, and I jerked open the door and strode into the reception room. I was the picture of radiant health, and to prove that the picture was right I joshed the receptionist nurse along, using a loud voice in the hope that it would carry back into the other chambers and the doctor would be impressed. I wanted him to think that my libido was libidoing well, thank you, because the doctors have a superstition that the turning of a man's interest into intellectual channels is an index of his real or cellular age, that is, that old men would rather pursue a paradox than a paramour, a fallacy which would be cured quickly enough if doctors had any time to go to burlesque shows—or any need to.

"Hiya, Sugarfoot?" I chortled.

"All right, and you?" the little lady replied coolly.

"Oh, the torso is more so." I laughed heartily. "Is the doc in?"

"Just a minute until I finish typing and I'll go find him." How can they look so professional when they're built like that?

Instead of sitting down and waiting like a novice would, I stood by the door on the inside hallway at one end of which, I knew, was the Snellen eye chart. Even though they don't do so, I think that flight surgeons should test the memory also and, wanting to cooperate in every way, I took some peeks. "B 9 L R G," I mumbled.

"Oh, Dr. DeRenne," the nurse called, "here is a man who has a benign allergy." Professional, ha!

A cigar came around the corner, followed by the tall gentleman I told you about, the flight surgeon. I don't know why they call them flight surgeons because they never cut out anything, even cigars.

"Hiya, Hy?" he asked.

"That's what I came here to find out," I replied. It is standard practice for pilots to say this.

"Ha, ha," he answered. That is standard practice, too.

From there on the pilots are divided into two schools of thought. About half of them become pugnacious; the other half get more and more merry. I am the merry type. There is one thing we all agree on, though; we all exhibit a profound knowledge of the intricacies of medicine. This impresses the doctors very much.

"Step into the last room on the right, and I'll be with you in a minute," he directed. I strode, exuding confidence and a little sweat. Along the wall in the room was a glass case filled with gleaming instruments put there to remind us of what might happen if we didn't take care in preserving ourselves, such as by avoiding worry or hard work. Preserving myself has never been much of a problem to me, personally, since I have used artificial preservatives for years but only in cases of emergency, such as sobriety.

Pretty soon the doctor came in. "Take off your clothes." I pulled in my stomach good, although it pushed up my chin some, and there I stood as the day I was born, with some slight changes, of course. I was no little interested to see the doctor take off his own shirt. We weren't going to match, though; it was just a very hot day and the doctor would trade dignity for a cool skin any time.

One of the blood-hound nurses poked her head through the door. "Wupps, excuse me," she said. "I didn't mean to break in on your privacy." I guess that's a euphemism. It was a lively place.

The doctor picked up a long printed blank. I have never found out why they always want you naked to answer questions, unless they think you feel franker that way.

Of course there were a lot of questions, just routine ones of no particular interest because the answers to them require no great imaginative talent.

"Do you drink?" he asked.

"Only soft drinks. Like Three Feathers."

After a lot more questions he came to that old cracker that the scientists like to worry around. "How's your love life?"

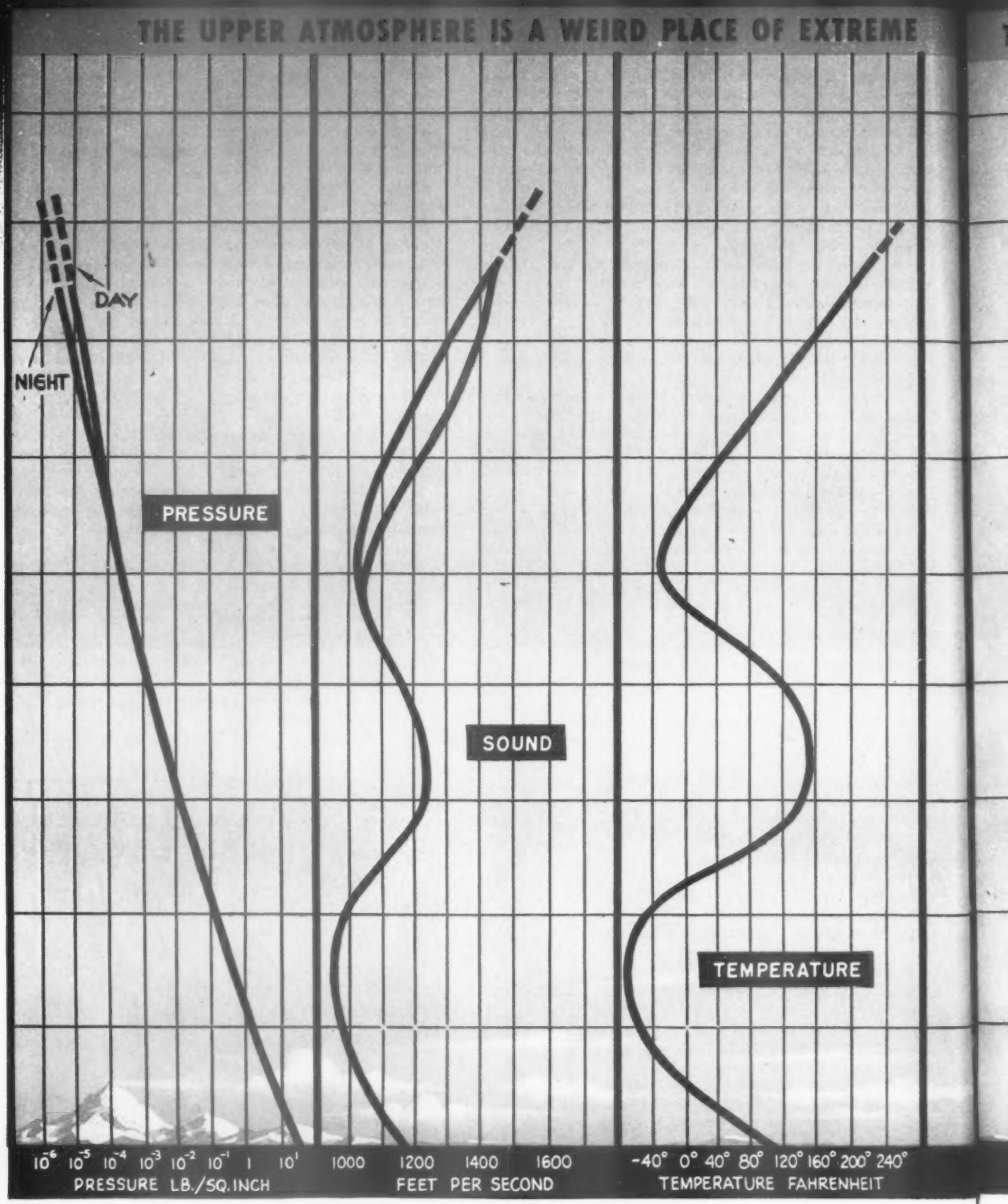
"Wel-l-l-," I began.

"Just a summary will do," he cut in. Somehow we got by that one. In his examination rooms he had all kinds of complicated scientific devices and apparatus, but he didn't have a lie detector.

After he had completed his (*Continued on page* 58)

"The next test involved me and two black sticks in a box."

WAR IN THE

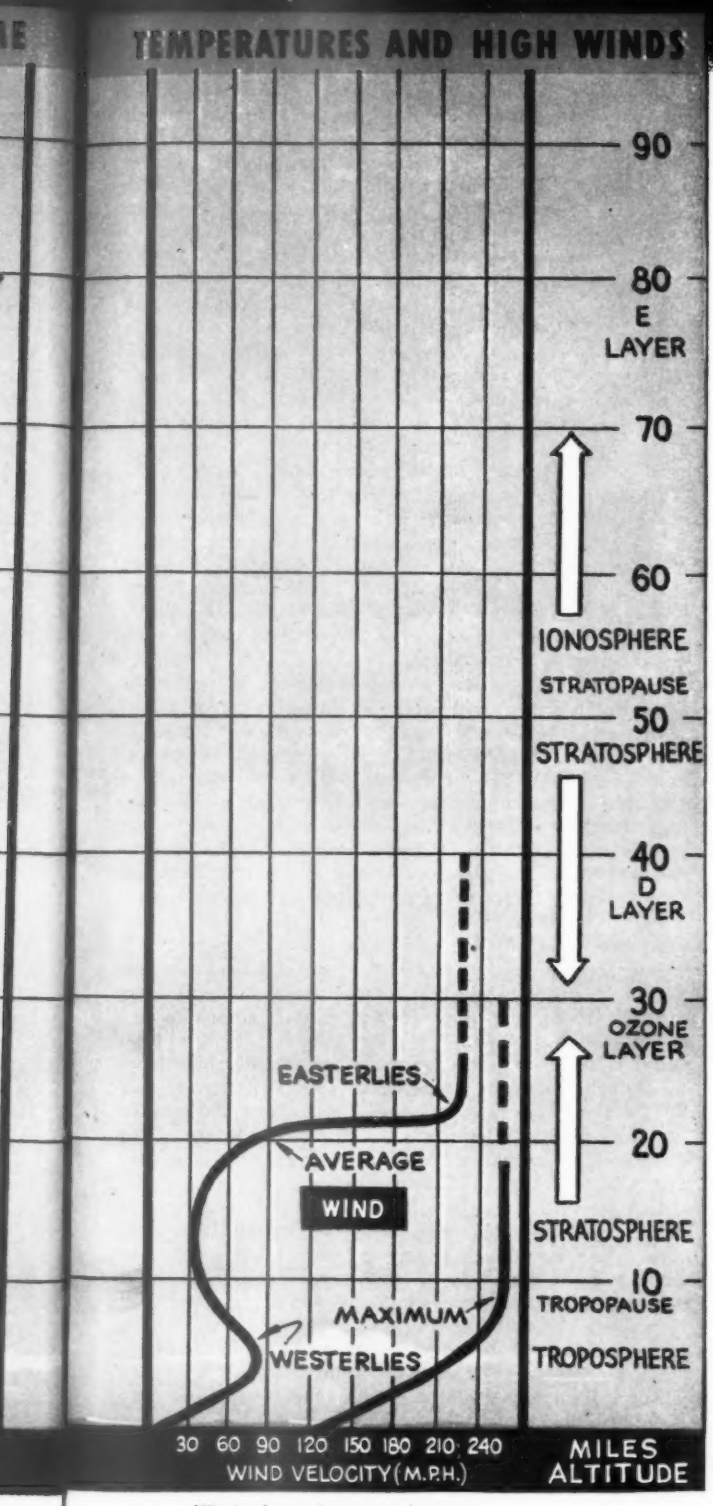


Pressure decreases with altitude in almost a straight line. At 90 miles it is about 1/1,000,000 lb. sq. in.

Speed of sound is determined by air temperature until the air finally becomes too thin for sound to travel.

Air temperature changes in a curious pattern. It is coldest at 15 miles, gets warmer, colder, and finally hot.

E STRATOSPHERE ?



Winds change from westerlies averaging 80 m.p.h. at 30,000 feet to easterlies averaging 210 m.p.h. at 22 miles.

Rockets gather new first hand facts on the upper atmosphere.

By HARLAND WILSON

THE GREAT AIR BATTLES of the future will be fought high in the stratosphere. That is already gospel in the Air Force and the Navy Air Arm. Both air services and NACA are working at high speed to develop planes and power plants capable, eventually, of flying and fighting hundreds of miles above the earth's surface. The costly USAF research program at White Sands, and the long-range *Neptune* rocket program under development for the Navy by Glenn L. Martin, are aimed at only the first step in this gigantic plan—to find out what the upper air is like.

For centuries man has gazed with awe at the vast reaches of the sky but he still doesn't know what it is like up there. Mount Everest is only 5½ miles high. The official airplane altitude record is less than 60,000 feet. The highest occupied balloon reached 13.7 miles and sounding balloons don't get over 22 miles. But the atmosphere extends 600 miles beyond these puny efforts; some think it may go as high as 60,000 miles.

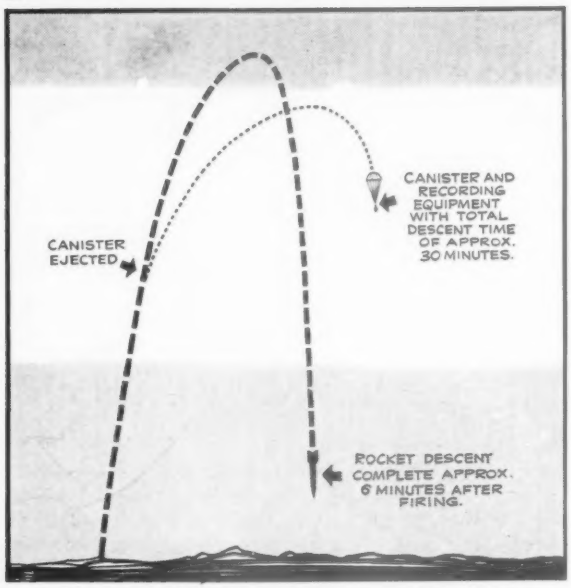
Man is an alien in this great and unexplored air ocean. And from what we already know about temperatures, air pressures and radioactivity in this formidable realm, conditions of flight and necessary protection are unlike anything on earth. What will our ionosphere fighters be like, and what is the tenuous gas like where they will operate?

It is only fair to state that no dates have been set for operation at high altitude. And yet we already have airplanes flying—and more in development—which with minor modifications should be capable of operating for brief periods, at least, far into the true stratosphere.

There is not enough oxygen at altitude to support piston, turbine or ram jet engines. Propellers are out of the question. Therefore our planes will have to be powered with rocket motors or with some form of atomic energy. We do have powerful rocket motors but they are still in a comparatively primitive state. And the NEPA project is exploring every possible avenue of developing nuclear energy power plants.

The V-2 rocket firings at White Sands have demonstrated that conventional aircraft controls won't work at altitude. The air is too thin to enable ailerons and rudders to get a "bite." But V-2s have also shown that control can be achieved by jet—by diverting a portion of the blast by vanes to give the rocket direction. Certainly something like this could be developed for our rocket-propelled planes today. But it is also possible that extremely high speed at altitude may develop enough air pressure against new kinds of controls to permit them to give the craft directional stability.

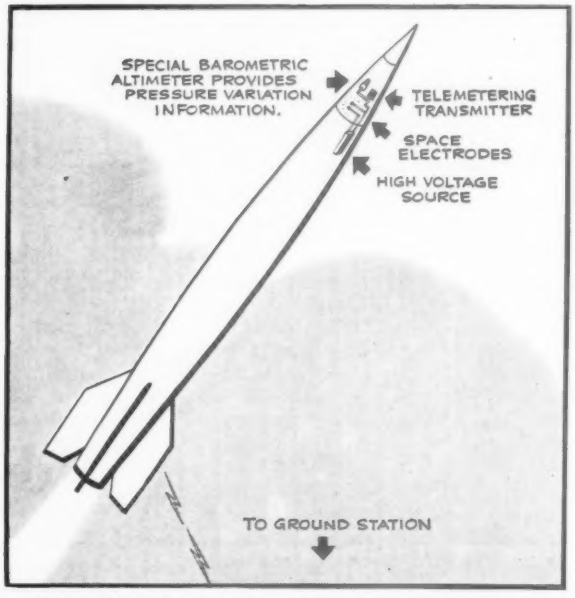
The Bell X-1, the Douglas *Skyrocket* (D-558-2), and the forthcoming Bell XS-2 have adequate rocket power


CANISTER AND RECORDING EQUIPMENT WITH TOTAL DESCENT TIME OF APPROX. 30 MINUTES.
CANISTER EJECTED
ROCKET DESCENT COMPLETE APPROX. 6 MINUTES AFTER FIRING.

Earth's magnetic field is recorded by parachuted equipment.

to carry them far higher than the present official world's altitude record of approximately 60,000 feet. It is known that the X-1 has far exceeded this altitude. In addition, even more advanced planes are in development.

Take the very first of these, the X-1. In its original design, the maximum potential speed was computed at about 1,100 m.p.h. at 70,000 feet from a ground take-off. With air launch this estimate was increased to 1,700 m.p.h. Actual performance was reduced when fuel pumps weren't available for the first models and the fuel had to be pressured in with nitrogen. Now that fuel pumps are available, the high speed and the altitude should be within easy reach again—at least as far as power is concerned. The uncertain quantity is the strength of the air frame. Furthermore, it is known that fuel or rocket motor improvements have increased thrust and economy so that far higher performance is probable.



Voltage breakdown data is telemetered to ground from V-2.

The basic rocket problem is fuel. Using *lox* (liquid oxygen) and alcohol, the X-1 engine burns nearly a ton of fuel per minute and has a duration at full power of only two minutes. And yet compare this with the prodigal energy expended by the V-2, which burns 287 pounds of propellants per second—nearly six tons per minute. At the end of its minute of life, the V-2 rocket motor attains a speed of 3,600 m.p.h. and often propels its cigar-shaped fuselage to an altitude of over 100 miles. That is hitting the ionosphere in earnest—but having once reached that objective, the V-2 has exhausted its fuel, has no means of guidance, and no provision for a human pilot. Nor could it possibly land safely.

We do have fuels which are more efficient than lox and alcohol, but they are likely to burn a great deal hotter and melt the rocket motor. The problem of metals able to withstand such heat is a main limiting factor in rocket design. Our best rocket motors have a hollow jacket surrounding the combustion chamber through which the alcohol is pumped on its way to be burned. Some of the fuels don't absorb heat as rapidly as alcohol so they can't be used in a regenerative motor, as this type is called. Other fuels, such as nitric acid and aniline, are dangerous. Hydrogen, one of the best fuels, is highly explosive.

In the unforeseeable future, when we have a craft which can operate dependably, what are some of the problems of high altitude operation? What is it like up there?

Our planes so far can operate only in the troposphere, which varies from five miles in thickness at the poles to about 10 miles at the equator. The troposphere is the region of weather. It is that portion of the atmosphere which is warmed by heat from the earth, which in turn has received it from the sun.

Any pilot knows that the higher we go, the colder it gets. But it doesn't get colder indefinitely. Along about 12 miles high we enter a region of constant —67° temperature. That is the arbitrary beginning of the stratosphere. Scientists used to believe that all of the upper atmosphere was cold. They know better now. Along about 20 miles high it begins to get warmer. At 35 miles it may be hot enough to cook an egg—and possibly you too. By the time you were 50 miles high, you would find it was 20 below zero again. But from there on it gets progressively hotter.

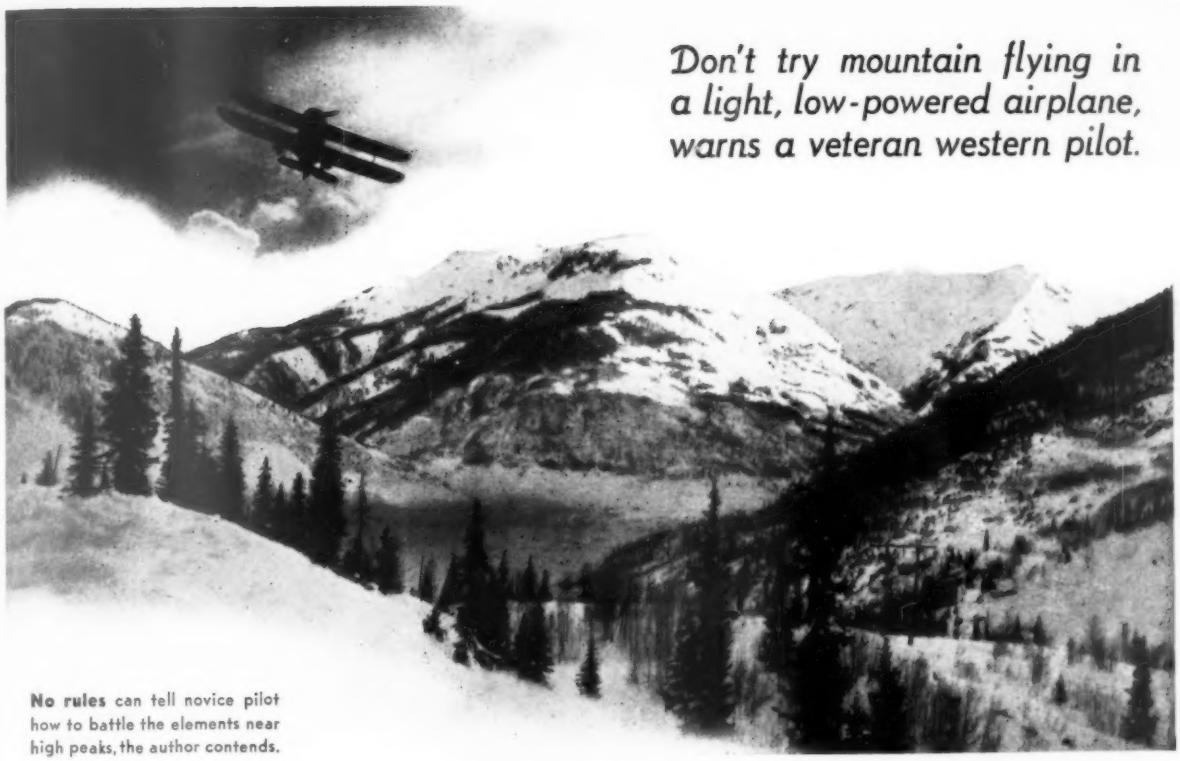
Just over 20 miles altitude there appears to be a constant east wind blowing at an average of 200 m.p.h.!

But the wind and the alternating cold and heat are only part of the problem which the stratospheric pilot will have to face. His oxygen mask, of course, will be useless over seven or eight miles high because outside pressure is too slight to force even enough pure oxygen into his blood. So his cabin must be pressurized. Indeed if it were not, by the time he reached 12 miles in altitude the outside pressure would be less than the internal pressure of his own blood which would boil and foam. Possibly he would drown in the steam of his own boiling blood!

The pilot climbing to altitude would be running into difficult speed problems because of the changing temperature. The speed of sound travels faster in hot air than in cold air, so he would fly faster at some levels than others without his mach number changing. Or if he were flying just above the speed of sound in cold air he would have to be careful not to run into compressibility problems when he entered regions of super-heated air.

None of these difficulties would make any difference over 50 miles high because the air molecules from that height on are so far apart they don't propagate sound waves—hence, presumably, no compressibility problems.

Friction heating by super-fast speeds in the high atmosphere is still a question. Some scientists argue that at extremely high altitudes, where the temperature is known to be over 300° and more, (*Continued on page* 75)



Don't try mountain flying in a light, low-powered airplane, warns a veteran western pilot.

No rules can tell novice pilot how to battle the elements near high peaks, the author contends.

Danger Lies Over the Mountain

By AMBROSE A. SHERRED

YOU are asking for a short but exciting life if you attempt to fly the Rocky Mountains in a light, low-powered airplane.

This viewpoint is not shared by most lightplane owners, the majority of the Civil Air Patrol or agents and manufacturers of lightplanes.

It is, however, based on years of personal experience, and on opinions of airline pilots and other veteran operators who fly regularly over the Rocky Mountains area.

We have learned the hard way to respect reserve power and performance, which certainly are not available in today's lightplanes *when operated at high altitudes.*

To attempt to fly regularly in this area in a ship which cannot EASILY CLEAR the highest peaks and surface air conditions directly affected by these peaks and ranges denotes either an ignorance of flying or foolhardiness of the nth degree.

I wish to go on record as disagreeing violently with various articles published recently telling *how* to fly the mountains.

There are no set rules, no constant danger areas, no cut and dried yardsticks upon which to measure mountain flying. I know that when I take off tomorrow heading west, I'll find new conditions which were not there on the previous trip.

One article goes so far as to set forth a set of so called "simple rules" for the novice to follow.

A recently-printed map, based on data compiled by the Civil Air Patrol and the Colorado Director of Aeronautics, shows danger areas and spots to be avoided in the Colorado Mountains. I fear that inexperienced mountain flyers owning lightplanes may procure copies of the map, memorize the rules and set forth blithely to a final resting place atop some lonely mountain peak.

I made my first flight over the Continental Divide in 1929 in a Curtiss *Robin* and since then have crossed the range over 200 times. That does not include innumerable flights over Pikes Peak, Longs Peak and along the Continental Divide on scenic passenger hops, photo flights and other non-scheduled flying.

In 1932 I made the headlines and Associated Press by landing a Curtiss *Robin* in a small clearing near the east entrance to the Rocky Mountain National Park at the foot of Fall River Pass. The (*Continued on page* 54)

THE OTHER SIDE OF THE QUESTION

"I've read too many articles giving 'rules for mountain flying'," writes author Ambrose A. Sherred. "The plain truth is that there are no rules for flying in mountains in light, low-powered planes." Sherred, a long-time mountain pilot, contends that the so-called "rules for mountain flying" are of more hindrance than help —for the man who operates the average lightplane. His advice: Stay out of the mountains unless your plane is easily capable of clearing the highest peaks and surface air conditions affected by those peaks.

A FLYING Holiday

THE *Mardi Gras*

Costumed girl gives the crowd an impromptu performance on the sidelines.

A fun-filled week is in store for pilots who fly to the Mardi Gras.

By LYNN H. BLACK

Associate Editor of FLYING

NEW ORLEANS will be jammed next month when over half a million persons flock to the southern city for Mardi Gras. Among crowds jostling through famed Canal Street for the celebration that has been called "the greatest free show on earth" will be hundreds of U. S. lightplane pilots.

For a refreshing change of pace, New Orleans can't be excelled from February 22 to March 1. Conventional behavior is discarded for the week, and even the veteran citizens join in a carnival spirit that turns the entire city into a festival of gaiety.

Visitors begin streaming into New Orleans even before the Mardi Gras officially begins. Trains and highways will be crowded, but the private pilot—whether in a *Cub* or twin Cessna—will find the airways offer a comfortable, easy route into the city.

Three airports are convenient to New Orleans, and pilots will have no trouble accommodating their planes. But unless they have friends who are willing to donate space on a living room couch, they may have difficulty finding a place to sleep. Most hotels have been booked to capacity for months, and even park benches are apt to be overrun by milling, excited throngs.

With luck, flyers may be able to get rooms through the New Orleans Association of Commerce (315 Camp Street) which in past years has had a list of quarters available in private homes.

Otherwise, carnival-wise New Orleaners offer a tip:

Fly to Biloxi or Gulfport (70 miles) where airports and dozens of first-rate hotels and tourist homes are located [see "Mississippi Gulf Coast," FLYING, January, 1948]. Regularly scheduled buses run between these cities and New Orleans, and the ride takes only about 90 minutes.

Each night during the week preceding Mardi Gras Day, March 1, parades wind through the downtown streets. Each parade is comprised of about 20 elaborate floats (on flat cars 20 feet long and 8 feet wide) which are still drawn by mules (as they were in the mid-1800s when the Mardi Gras began in this country.)

The first big torchlight parade was held in 1857 on Shrove Tuesday, (the last day before Lent) by a group of New Orleans citizens calling themselves "The Mistick

Glittering parades wind through the streets on Mardi Gras Day. On March 1, thousands will jam streets to watch.

Krewe of Comus." Since that time many other groups have joined in the fun and members of these private clubs or "krewes" pay for their parades (usually $20,000 to $30,000 each) in the form of membership dues.

On Mardi Gras Day, New Orleans' 200 square miles are turned into a world of fantasy. On this day street-masking is allowed and open house, music and street dancing start early in the morning. Masked celebrants pour into the Vieux Carre (French Quarter) where traffic is banned for the day and only shops catering to the crowds remain open. The first big parade (sponsored by the Krewe of Rex) starts around 11 a.m. Dozens of other parades continue all through the day, including the procession of "King Zulu" which is composed of a large portion of the Negro population. At nightfall the most colorful of the pageants, the "Parade of the Krewe of Comus," is followed by the tolling of cathedral bells at midnight, signifying the beginning of Lent and the end of Mardi Gras.

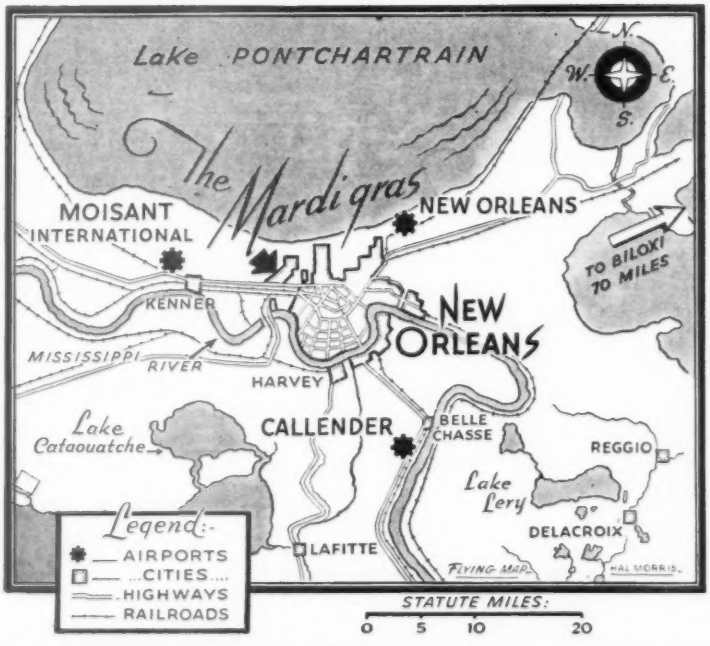
New Orleans is famous for its Creole cooking and scores of restaurants serve dishes handed down from early colonists. Southern gourmets offer a hint: Forget the standard U. S. dishes when in New Orleans. Ask the waiters about their "house specialties." In many restaurants recipes are as jealously guarded as State Department secrets.

In the lulls between Mardi Gras parades and festivities, pilots visiting New Orleans for the first time should not miss points of historical interest:

(1) The Site of the Battle of New Orleans is just below the city on the Mississippi River where Gen. Andrew Jackson defeated General Pakenham in the War of 1812.

(2) The Cabildo Museum, once the seat of government under Spanish, French and U. S. rule, where the transfer of the Louisiana Territory took place, is open daily. The Death Mask of Napoleon I made 42 hours after his death at St. Helena by his personal physician is on display there.

(3) Buildings and narrow streets that have remained unchanged for over a century (*Continued on page 77*)



New Orleans Airport, nine miles from the city on edge of Lake Pontchartrain, caters exclusively to private pilots.

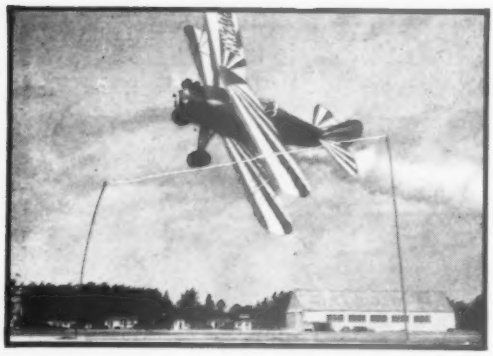
Early to rise for Betty. She leaves wake-up call because she has a full day ahead of her.

Setting-up exercises clear cobwebs away. She has to be sharp for her airshow performance.

Leaving Ambassador East Hotel, Betty strid briskly to cab which will take her to airpo

Betty Skelton

FLIES AN AIRSHOW



The Little Stinker makes a wing tip pickup.

It's not stunting but precision aerobatics, says woman champ who flies at 40 airshows each year.

By CURTIS FULLER

Managing Editor of FLYING

IN THE FRONT ROW of the airshow grandstand, a florid-faced pudgy man chewed his cigar and stared at the midget red biplane. He shook his head. "Beats me," he said to the glittering blonde beside him. "Beats me how she does it."

The plane, with mathematical precision, did hesitation Cuban eights, a four-leaf clover trailing colored smoke, a 360° inverted turn. And then it tilted sidewise with wing tip less than six feet from the ground and snared a light rope from between two poles 10 feet high and 15 feet apart.

Up it zoomed, looped, and dropped to a landing almost directly in front of the announcer's stand.

"Beats me," the fat man said.

Out of the biplane stepped a pretty little slack-clad girl, looking like a college beauty queen. She was introduced to the crowd as "Miss Betty Skelton, Women's International Aerobatics Champion."

At 22, Betty Skelton has been flying for 10 years. She was born June 28, 1926, in Pensacola, Fla. Her real name is Betty *June*, named after the month. She was just a snub-nosed Florida kid, undistinguishable from legions of other Florida youngsters until she was 12 years old. Then she took a step which not only changed the course of her life, but that of her family as well. She wrote for some aviation pamphlets, which came in care of her father, David L. Skelton. Dave spied the pamphlets and read them. He got interested. So did Betty's mother Myrt. They all started flying the same day.

In no time at all Myrt and (*Continued on page* 76)

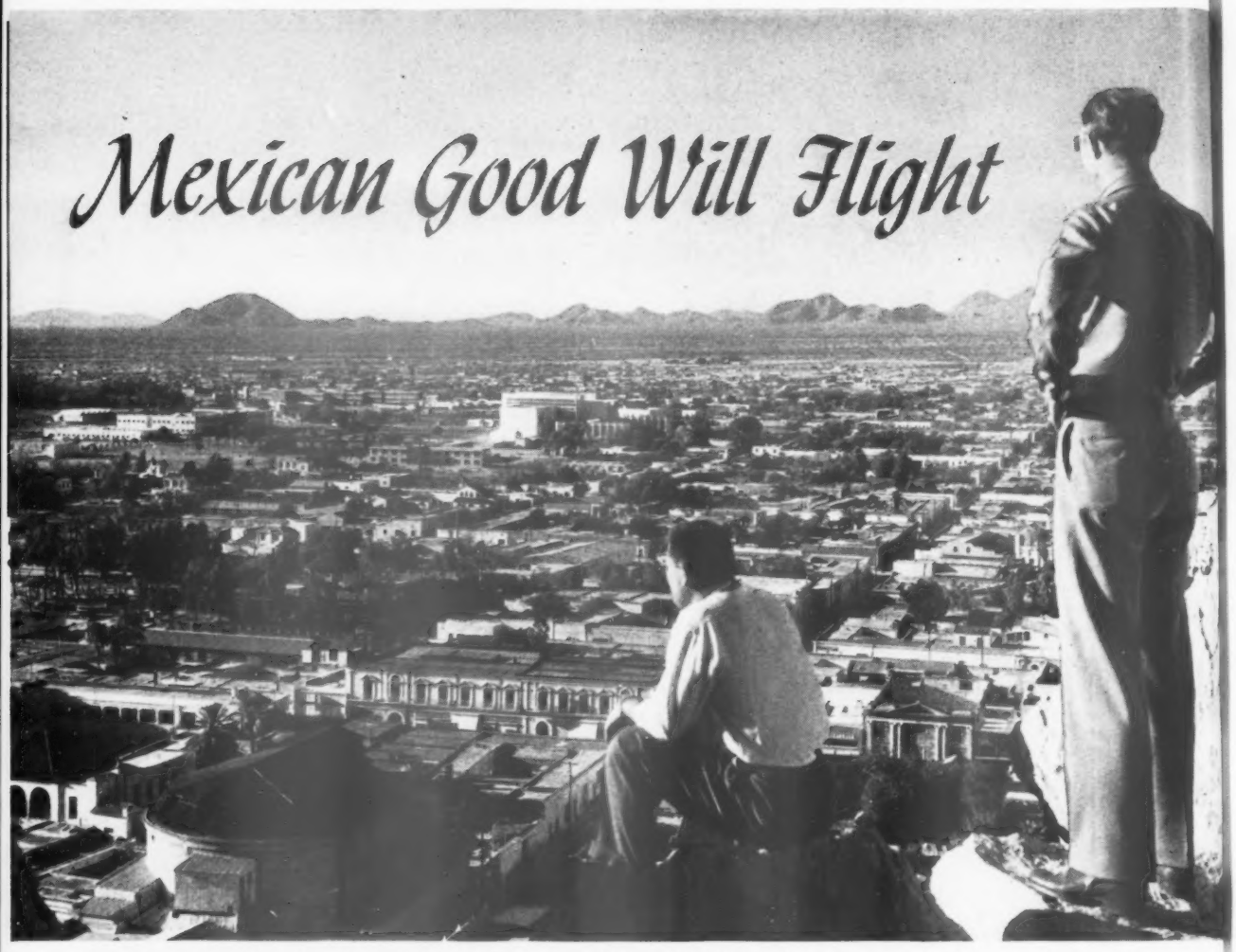
Careful pre-flight check includes oil, gas, controls, and thorough once-over of cockpit.

Betty buckles on quick-fitting back pack parachute, then climbs into tiny plane and takes off for crowd-thrilling exhibition.

Back on ground, Betty is congratulated by master of ceremonies and introduced to audience.

For relaxation, Betty rides the roller coaster with member of Blue Angels, Navy stunt team.

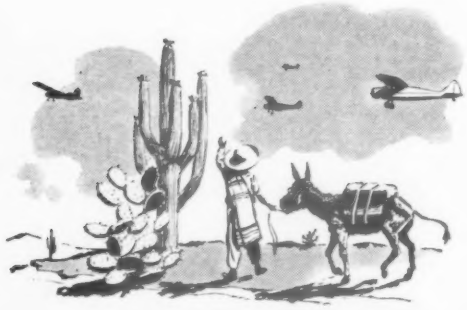
Mexican Good Will Flight



At Hermosillo two Oregonians (Ross Philippi, Portland broker, and Howard TeSelle) climb the Sierra Camplan for panoramic view of the city.

A BUSINESS PILOT'S REPORT

Oregon's flying businessmen promote trade with Mexico on a 3,500-mile aerial vacation.



By LEVERETT G. RICHARDS

Aviation Editor, The Portland Oregonian

MEET the world's flyingest businessmen.

In less than six months these airborne executives of Oregon, ranging from the tropics to the arctic, have logged more than 2,000,000 air miles, combining business with pleasure in a demonstration of the utility, economy and safety of the lightplane.

They are not millionaires with uniformed flight crews and multi-engined junior airliners at their command. There's not an oil well among them. All are working men —mechanics, contractors, farmers, accountants, lawyers, and salesmen. All fly their own planes. All use them mainly for business. None are professional pilots.

Their average age is 45. Oldest is Will Peters, 64. State Senator Angus Gibson, 62, is a close second. Their planes range from *Cubs* to *Ercoupes,* Cessnas, Stinsons, *Bonanzas,* Fairchilds, and *Navions.* A Grumman *Widgeon* and twin Cessna are the only war-surplus planes in the lot.

Yet these average pilots in their average planes average more than 200 hours a year each in all kinds of weather in, over and around all kinds of terrain on business—some of them up to 1,500 and 2,000 hours—with a safety record that puts the automobile to shame.

W. O. Wiley, a flying farmer, prepares to take off in a rainstorm that delayed tour's start. His son, Don, 16, was youngest on trip.

Oregon planes line airport at Yuma, Ariz., while pilots are feted. The fleet plugged "Oregon business" at stops along the route.

In two air tours last year they showed how man can use his wings to change winter into summer, shrink the world to his own size and make all nations neighbors.

In February, 1948, 80 of Oregon's flying businessmen went south with the birds from Portland to Hermosillo and Guaymas, Mexico, in a campaign to promote trade and tourist travel. They made a little aviation history while they were at it. Their 32 planes comprised the biggest aerial armada ever to cross the border. They covered the greatest distance of any such tour, averaging about 3,500 miles round trip.

In August the same flying businessmen made a tour to promote establishment of new air and sea trade links with Alaska. The 50 businessmen—and women—in 15 planes covered more than 7,000 miles from Portland to Nome, Kotzebue, and Fort Yukon, north of the Arctic Circle. They followed the Alcan highway over some of the ruggedest and most remote bush country in the Far North. All without so much as denting a fender. No one got lost. No one cracked up. No one turned back. Although the planes averaged more than 60 hours of flying time on this tour, not one engine so much as misfired. None required mechanical attention of any kind during the entire trip.

What's more, the cost was about half of that by automobile. While tourists were spending $1,500 and two to three weeks driving the Alcan highway, the men with wings made it in three days at an average over-all cost of less than $700 per plane. The Alcan proved a better airway than a highway.

The Mexican tour was an even more striking demonstration of the dependability and utility of today's airplanes. The worst weather in 30 years dogged the tour the whole 1,500 miles. Yet these 63 men and their 17 women followed the sunshine trail over and around the Cascades and the Sierras without mishap when even automobile traffic was halted by howling blizzards and 90 m.p.h. sandstorms that cut the paint off automobiles and closed the highways in California's deserts.

Spark plug of the Oregon flying businessmen, president of their Oregon International Air Tour association and leader of most of their half dozen tours since the war, is L. S. "Doc" White, quiet, genial bow-tied head of the Aero Credit Corporation, auto and airplane finance company. He learned to fly "a little" before (*Continued on page* 74)

Mexican customs inspection was routine at Nogales, Ariz. The 32 planes in the Oregon "aerial armada" comprised biggest group ever to cross border.

Mexican hospitality overwhelmed the visitors. Parties and fiestas crowded their schedule during tour.

1 Joe Barta studies card file of prospects while preparing mailing list for a new batch of sales promotion material.

How I Sell Planes

Businessmen can use planes—but too many operators do not know how to merchandise them.

By JOSEPH T. BARTA
Sales Manager, Westchester Airport, Armonk, N. J.
AS TOLD TO JERRY LEICHTER

PHOTOGRAPHS BY WALTER STEINHARD

2 Visiting prospect at his office, Barta brings sales aids, including brochure giving facts on "Businessmen Who Fly."

LET'S face it. Too many airplane salesmen are not equipped to sell a high-priced product in a gradually constricting market. They get lost trying to locate prospective customers among a smaller group of tighter-fisted possibilities than they've had to deal with in years.

Every airplane manufactured today has its own effective sales appeal, whether it is price, construction, utility, economy of operation, ease of upkeep, just plain good looks, or a combination of several of them.

Some salesmen seem to feel that they must be selling clunks because their products aren't hot sellers in the present market, so to even things up they've fallen into the habit of knocking everybody else's planes. Others act as though all they have to do is sit around their airport offices and, because their wares are attractive, wait for the customers to come to them. Those glorious days of '46 may not return for a long time.

The present small market demands the type of campaign in which a salesman must sell himself, an airplane and his airport in one complete package. He can't afford to neglect any possibility, but at the same time he doesn't want to get involved in an aimless race that can end only in a nervous breakdown.

I'll say now that I don't know all the answers. What I do have is an organized sales program that has enabled me to cover my territory, emphasize every available asset in the airplanes I sell and the airport I represent, and has uncovered prospects and caught sales for me that I probably never would have been able to touch otherwise.

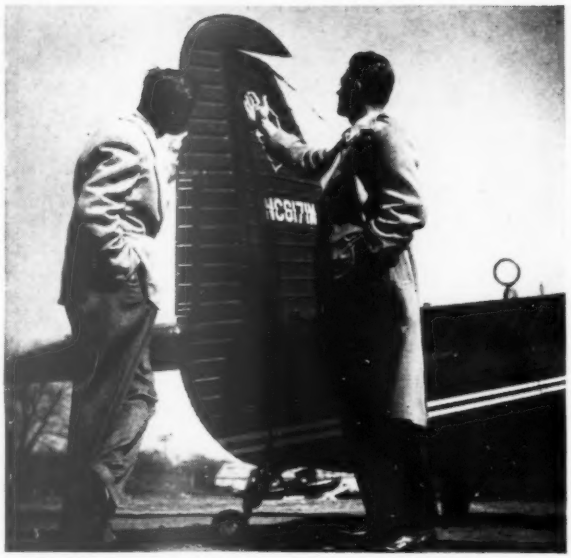
My program has no hidden gimmicks or overnight success points. I have applied common routines, integrated them for my territory and have proved to my own satisfaction that when they're used honestly and completely, they will work. The basic program can be transplanted to any territory, urban or rural.

No prospect is altogether typical and a salesman has to adapt himself and his procedures to each individual he works with, but he does follow logically the same order of locating the prospect, making his approach and following through—either to sale, future sale or no sale.

The base of the complete salesman's kit is the prospect card file—indexed, accurate and up-to-date. The minimum listing should include a person's name, address, age, telephone number and business address; but any kind of fact about the man may be helpful when you least expect to be able to use it: family, club memberships, hobbies, where he spends his vacations, approximate annual income and any additional odd items about his likes and dislikes.

Names for the file may come from a wide variety of sources, including the classified section of the phone book, but the most important are students at the airport, airplane owners in the vicinity and a list of high income people in the community. Besides making his own personal contacts as often as possible (one prominent aviation merchandiser advises seeing at least two people a day, every day) the salesman has to follow a contact routine that will invite people to come to him.

The best way to become a (*Continued on page* 59)

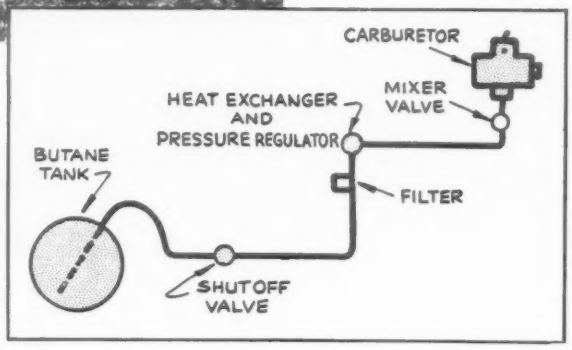


3 **At airport,** Barta points out features of plane to prospect Ogden Brower, sales representative of a Chicago firm.

4 **Brower family** is "sold" on plane. "A wife's opinion is vital," says Barta. He brings colored folders for children.

5 **Clinching deal,** Barta discusses some of Stinson's finer points with Mrs. Brower while the youngsters' father shows them the plane's radio. Brower had previously flown the plane. Barta emphasizes a rule: "After a plane is sold, you have to keep the buyer satisfied."

Test plane with new fuel system installed flew 38 minutes on a CAA-observed flight. Butane costs only nine cents per gallon, making plane's operation much more economical than with gasoline. Diagram (below) shows how the fuel system works.



Butane-Powered Cessna

By MATHER M. EAKES, Jr.
Aviation Editor, Daily Oklahoman
Oklahoma City, Okla.

Using unusual fuel system, Oklahoma City inventor flies his lightplane on butane gas.

LANDRUM L. HUGHES, Oklahoma City inventor, believes butane will eventually replace gasoline as aviation fuel through use of a new fuel system he has developed.

Recently installed on a Cessna 140, the system was successfully flown under official supervision of the CAA.

Though attempts have been made in the past to use volatile butane and propane as airplane engine fuel, Hughes' devices are believed the first successfully used on an airplane in flight with the CAA on hand to check it.

Butane and propane, Hughes says, have all of gasoline's advantages, none of its dangerous disadvantages.

Only two serious problems have been encountered:

(1) Fuel isn't readily available at airports. (That problem, Hughes believes, will be solved quickly when butane companies find customers at airports.)

(2) Normally a gas, butane must be carried in a special high-pressure tank to keep it in liquid form. It requires a considerally heavier tank to keep pressure above 200 pounds than for regular gasoline.

On the test flight, Hughes installed the butane tank behind the seat. By use of a "wet line" the liquid butane was drawn from the tank into a "heat exchanger and pressure regulator."

There, by use of hot oil, the butane was re-vaporized at about 170°. By normal suction, the carburetor took what fuel it needed from the pressure regulator through a control valve.

With the "wet line"—one that draws liquid fuel—high pressure is maintained in the tank, Hughes explains. If the line took off vapor from the top of the tank the pressure would drop and temperature fall. The tank would become a refrigerator.

For the flight, Hughes rigged the system for the Continental engine so the butane could be shut off and the flow of regular gasoline turned through the carburetor.

"Butane is much safer than gasoline but people generally think it's like flying a plane on dynamite," says Hughes. "So I fixed it so both could be used."

Pilot Fred Reese, fixed base operator at Shawnee, Okla., took off on the test flight on regular gasoline, switching to the butane fuel after getting to altitude. After using both fuels intermittently during the flight, he landed on gasoline.

As for the safety factor, Hughes contends butane is superior. Butane vapor is hard to ignite in open air. It has to be in a confined place to burn. Gas fumes on the other hand will explode in open air.

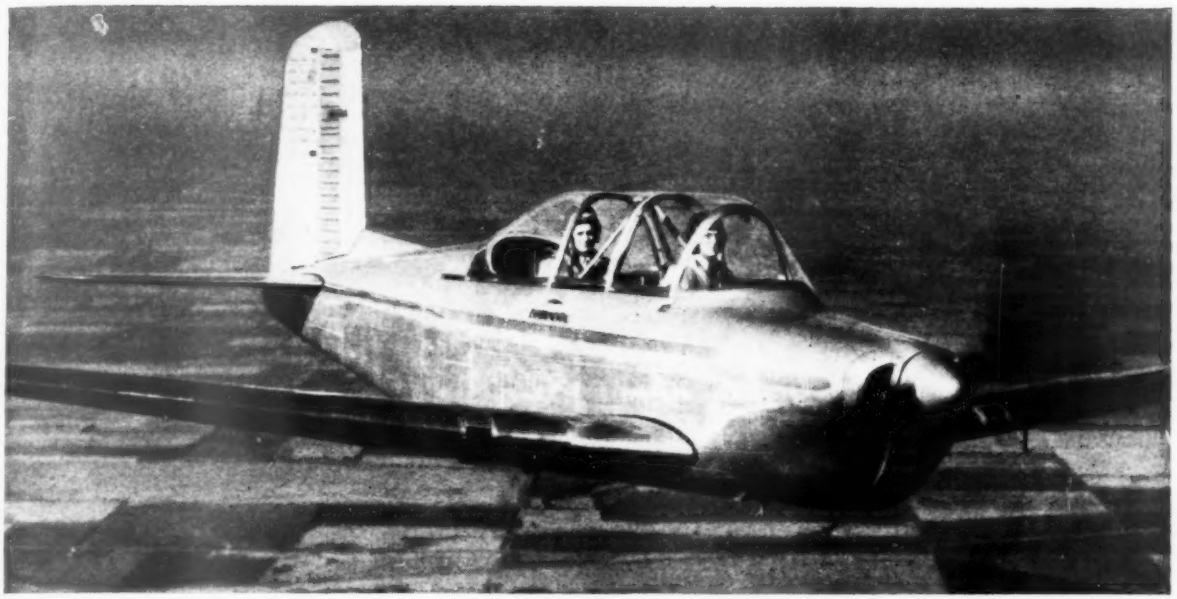
An excess-flow valve is used on the line bringing the butane from the tank to the heat exchanger and pressure regulator. Thus, if the line were broken, the pressure in the tank would close the valve.

A relief valve is installed on the tank to pass off the excess pressure when it gets over about 240 pounds.

Hughes has made arrangements to install his new system on a BT-13 in Oklahoma City, this time trying a new type heat exchanger and pressure regulator. Hot air from the engine exhaust will be used to re-vaporize the butane.

He plans to use electric heat for the initial revaporizing. He says an electric heater will start the re-vaporizing process sufficiently in 30 seconds to start the engine on butane. After it is started the (*Continued on page* 75)

HAVE YOU SEEN?



Beechcraft Mentor (Model 45) is primary and basic-advanced trainer designed on Beech's own initiative. It is two-place, with 160-m.p.h. cruise at 10,000 feet and maximum dive speed of 280 m.p.h. It is based on the Bonanza but does not have latter's butterfly tail.

Norwegian C.5 is utility land- or seaplane with 45-foot span, 320-450-h.p. engine, useful load of 1,600 lbs., 625-mile range.

"Stits Junior" is tiny plane built by Raymond Stits, Battle Creek, Mich. Span is 10 ft. 10 in.; empty weight only 274 lbs.

Fairchild M-84 is post-war design with PT-23 wing, engine and engine mount and slightly cut-down fin and rudder. Four-placer cruises at 140 m.p.h. This is only article built, was shelved for all-metal F-47. It is used as executive transport by Ranger Aircraft officials.

WHAT'S IN A PICTURE?

TO THE average foreign correspondent who cabled the news excitedly from occupied Germany, the significance of this photograph was only that it proved how closely the Russians were buzzing our transports in trying to frighten crews on the Berlin Air Lift. An American photographer snapped the shot through the porthole of a C-47.

To a trained intelligence officer, however, this picture tells a great deal more. Two of the world's foremost identification experts (who must remain anonymous) have examined this picture, and here is what they have to say about one of the few Russian planes which have gotten close enough to the Americans to be photographed:

The fighter is a Yak-3, one of the last to be built. The experts deduce this because the plane has a new position on the top nose for a cooling air inlet. The photograph also offers an unusual opportunity to study the high-speed flaps, which are lowered here to stop air getting into the coolant radiator under the fuselage. The tail wheel is down—presumably because the pilot is too lazy to retract it. Unless he had a hydraulic failure, the only other explanation is that the pilot had his main undercarriage legs and flaps down to slow him to the speed of the C-47 he was buzzing, and that the tail wheel was to be the last item to be retracted and had not yet come up when the picture was taken. This late version of the Yak-3 also has a trim tab on the rudder.

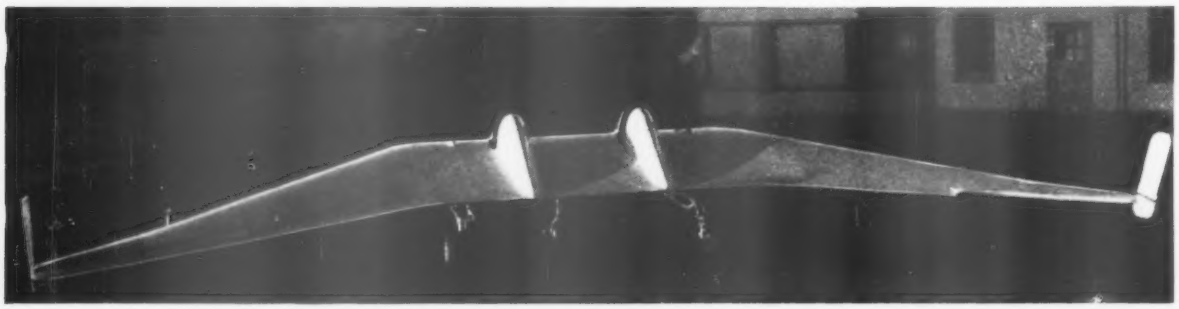
The Yak-3 has a span of 31 feet, length of 28 ft. 11 in. Its average loaded weight is only 4,848 pounds. It is powered with a VK-107 (designed by V. Klimov) 12-cylinder V-type liquid-cooled engine with a two-stage compressor. Some experts say it is a Hispano-Suiza design built under license in Russia. It is rated at 1,320 brake h.p. at 2700 r.p.m. with a compression ratio of 7:1. It burns 95 octane gasoline.

The propeller is modelled on the Hamilton Standard with a 20-mm. Sh-VAK cannon firing through the hub. Rate of fire is 600-800 per minute with 150 shells carried. The other two guns are 12.7-mm. Beresins mounted atop the fuselage and firing through the propeller arc at the rate of 800-1,000 rounds per minute, with 150 rounds per gun.

Performance is poor by U.S. standards, but being lightly loaded and very small, the Yak-3 can do 343 m.p.h. at about 12,000 feet. It can climb to 16,400 feet in four minutes.

The fuselage framework is of crude welded steel tube covered by two half-shells of wood attached to the tubing by webbing bands, and then fabric-covered and lacquered. The wing is built in two parts and attached to the bottom of the fuselage, forming part of the fuselage and cockpit flooring. The main structure consists of two main spars of extruded metal with wooden ribs covered by plywood and then fabric. All control surfaces are fabric-covered. The cockpit hood slides back.

The Yak-3, the newer Lavochkin La-7 and the La-9 form the defensive equipment of the Soviet's Berlin Air Force. The Yak-3 is an all-round dangerous machine in the hands of a competent pilot, even in these days of jets. END



Tailless glider is research craft being tested for flight characteristics by Canadian National Research Council. It was recently towed from Edmonton to Ottawa. It is two-seater, fully instrumented for research, has 46-foot span. Structure is primarily wood.

Boulton-Paul Balliol T.I. is British trainer with gas turbine engine driving single prop.

De Havilland Sea Hornet Mark 20 is latest production model of carrier-borne British recco-fighter. It is adapted from Mosquito but is smaller.

Gorgon IV is Navy missile powered by ram-jet engines and built by the Glenn L. Martin Company. Missiles have made several sustained controlled flights of over 10 minutes. Gorgon IV is launched in air and controlled in flight from ground, but may be preset.

Schweizer 1-23 is new production sailplane patterned after record-breaking 1-21, which won 1947 national championship. Craft weighs 358 lbs., and is designed as a Class I sailplane with design speed of 123 m.p.h. Wing span is 43 ft. 10 in. Price will be $2,195.

I Learned About Flying From That! NO. III

Author (left) and his companion, Dr. L. E. Downs, were crossing the continental divide when they discovered they were low on gas.

By
A. G. MAYNARD

It's too late to think about gas when your tank registers 'empty.'

NORMALLY an altitude of 14,000 feet and temperature 25° below zero was to be expected when crossing the continental divide, which was clearly covered by several feet of swirling powder snow. Under other circumstances the awesome spectacle of rugged peaks above and below us would have been breathtaking. But not this time, as my flying companion, Dr. L. E. Downs, and I frantically attempted to wrench free the frozen fuel selector valve in our BT-13. Our hatches open, safety belts off, we were prepared, although reluctant, to parachute from the ship at the first sign of engine failure.

The doctor and I had decided to fly over the divide from Denver to Grand Junction, Colo. This particular day in December, we merrily climbed aboard, ran up the engine, checked the mags and took off. Not much of a cockpit procedure, but Doc and I are primarily soaring pilots and had never fully learned the MUSTS of checking a powerplant.

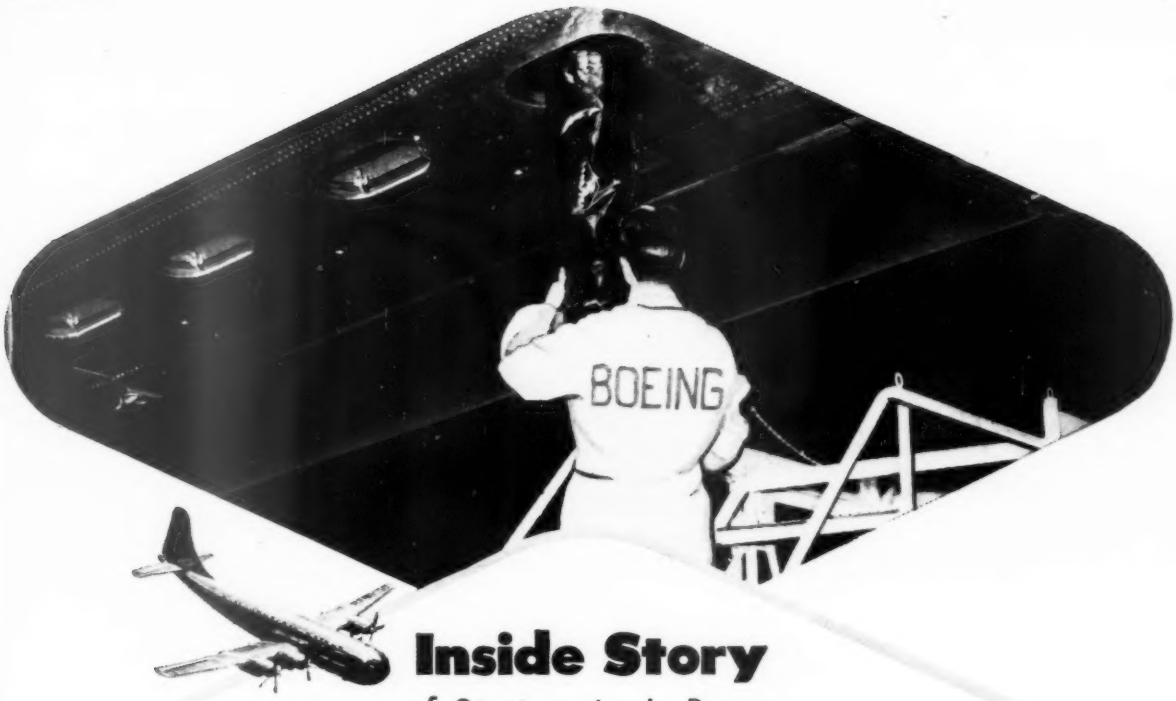
Our trip to Grand Junction was relatively uneventful, though near Montrose, Colo., we experienced some difficulty. The peaks were obscured by clouds, and we were forced to go the rest of the way "on the deck" and through the valleys. Upon landing at our destination we were quite proud of ourselves and laughed at the tales we could tell in the next hangar flight. The real tale was yet to come.

It seems that we had picked a bad weekend to make the trip, as our forecast had failed to note the presence of an occluded type front which culminated in a nice little snowstorm. This definitely grounded us for the next two days. By this time our friends had tired of us and ordered good weather for the third. Upon arriving at the field we filled the right tank with 81 octane, the only kind available at the time. We had 30 gallons of good 91 in the left, so we were "set" for take-offs and landings. We then ran through our sketchy procedure and took off. With clear skies above, why should we take the safer canyon route home? Instead we picked a heading of 62° and headed straight across one of the toughest airline routes in the U. S.

About five minutes of the normal chatter back and forth on the inter-com and we returned to our thoughts. Mine were of oil pressure, cylinder head temperature, oil temperature, air speed, that party last night, altitude, sailplanes. Then suddenly I was torn out of my reverie by Doc's voice over the inter-com saying, "How about changing tanks, friend?" That was a good idea. I had neglected to do so after take-off. I looked down at the left tank which we were using, and it showed about 10 gallons. Knowing the right tank was full, I casually reached for the selector valve and attempted to turn it to right tank. It would not budge. Frantically, I let go of the controls and with both hands tried to break it loose. Still it would not move.

Almost incoherently, I called Doc on the inter-com to help me. With our combined strength on it, we only succeeded in stripping the gears. Thoughts flashed through my mind: Condensation had evidently formed in the valve. Extreme low temperature had frozen the valve in a fixed position. What a plight we were in. What foolish negligence. Only a rank novice should be accused of neglecting to drain the condensation that accumulates in the tanks in extreme varying temperatures.

We immediately checked the map for emergency fields. They were useless, we found, after flying over them. It would have been suicide to attempt a landing on a mountain meadow covered with several feet of drifting snow. Some few minutes later we arrived over a typical mountain town which had a ski run on its outskirts. We felt sure this was Glenwood Springs, and we knew they had an airstrip in a canyon a few miles south of town. "Head up and locked," we entered our (*Continued on page* 71)



Inside Story

of Stratocruiser's Range

One of the secrets of the new Boeing Stratocruiser's amazing 4,200-mile range is 35 bantamweight Goodyear Pliocel fuel tanks of 7,700 gallon capacity, stowed inside the giant wing. Pliocels, a development of Goodyear Research, are made of specially treated, gas-tight nylon fabric. They weigh only .080 lb. sq. ft. providing maximum gas capacity with minimum weight. They outlast heavier metal tanks—can be built to fit any size or space, permitting fuel stowage in places heretofore impractical or impossible. For the full story on Pliocels or other Goodyear Aviation Products, write: Goodyear Aviation Products Division, Akron 16, Ohio and Los Angeles 54, California.

Pliocel—T. M. The Goodyear Tire & Rubber Company

GOODYEAR
AVIATION
PRODUCTS

This large Pliocel tank is easily folded for installation through small apertures, as shown in top photograph.

MORE AIRCRAFT LAND ON GOODYEAR TIRES, TUBES, WHEELS AND BRAKES THAN ON ANY OTHER KIND

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is: "To make flying more useful, less expensive, safer and more fun."

Headquarters are: 15th and New York Aves., Washington 5, D. C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING MAGAZINE.

CAA SHOWS OFF

The most educational CAA demonstrations in years were held recently at that organization's experimental station at Indianapolis. Invited guests included interested Government officials (Air Force, Navy, congressmen and senators), and a few representatives of the aviation industry, AOPA among them.

CAA, in cooperation with the Radio Technical Commission for Aeronautics, gave a real-life demonstration of the 15-year program of air-navigational aids to be installed gradually throughout the U. S.

Among these were demonstrations of omni-range, automatic distance-measuring, and off-course-computing-equipment. Except for omni itself, all this equipment will be available almost exclusively to the airlines

Other equipment demonstrated included ILS (instrument landing system), GCA (radar ground-controlled approach) and slope-line low-visibility approach lights. The latter is a novel arrangement of truck headlights and pieces of metal strips, mounted in such a way that the pilot can tell at a glance whether or not he is approaching the runway properly.

INSURANCE STUDY

AOPA is about to start an exhaustive survey into the accident statistics compiled during the life of AOPA's present insurance program. The compilation is expected to include hitherto unpublished data concerning the types of accidents most common to particular types of aircraft.

PRODUCTION TOTALS

AOPA has just been advised by the Aircraft Industries Association that a total of 465 personal planes were delivered by the 10 major manufacturers in October, compared with 575 in September. These deliveries bring the grand total for January-October to 6,455 personal planes.

FLASHING LIGHTS

One of the first successful flashing systems for personal plane navigation lights has been developed by a New York concern and will be manufactured under a subcontract by the Texas Engineering and Manufacturing Co., builders of the Temco *Swift* The flashing system, known as "Flash-Aire," is reported to be inexpensive and quickly adaptable to personal planes. The device has been approved by CAA as part of a personal-plane development program in which AOPA has participated since its inception.

SPIN REQUIREMENTS

Comment of AOPA members on the recently-announced proposal to eliminate spins from pilot flight tests is about equally divided between pro and con. While it originally appeared that private pilots unanimously favored elimination of spins, a substantial number of those who have written national headquarters since the recent CAA announcement proposing spin elimination has voiced disapproval of the plan. Gist of their comments:

"So long as personal planes can be spun, and so long as spins continue to head the list of fatal accident causes, pilots should at least have some basic knowledge of what to do in case of a spin. The simple elimination of the spin test doesn't prove a thing. When are the manufacturers going to eliminate the spin?"

NEW DOWNTOWN STRIP

Chicago's long-awaited lake front airport has just opened for business. It's within a mile of the Chicago downtown shopping district, and within walking distance of some of the city's largest hotels. The single runway is 2,800 feet long and 150 feet wide. There are facilities for parking 200 planes and 275 cars.

Last reports to AOPA were that landing fees will be charged private pilots using this field. AOPA members are cautioned against using the strip for that reason, at least until national headquarters has received up-to-date landing fee information from Chicago airport officials. Full details will appear in the AOPA PILOT.

CHICAGO MARKERS

AOPA's Fort Dearborn Unit continues to report highly-successful results with its air-marking program in the Chicago area. Two newest markers installed are on the roof of the Merchandise Mart and the factory of the Martin-Senour Paint Co., donors of the paint being used in the program.

Other markers are slated for several other prominent buildings in the Chicago area, including the Tucker automobile plant.

RADIO IDENTIFIERS

Only a limited supply of the official Government directory of location identifiers is left at AOPA national headquarters. The directory is particularly useful to airport operators handling a large amount of transient airplane traffic, and to pilots traveling around the country extensively. END

Chicago airmarker on Merchandise Mart was painted by volunteers (including AOPA members). Paint was donated by Martin-Senour Co.

Learn AVIATION

AN ESSENTIAL INDUSTRY IN PEACE OR WAR

With today's new spectacular developments in Aviation, there are more opportunities than ever. "Cal-Aero" gives you just the right thorough technical and leadership training to take advantage of these opportunities, and to enable you to make more money — "Cal-Aero" graduates are in demand.

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MASTER AVIATION MECHANICS

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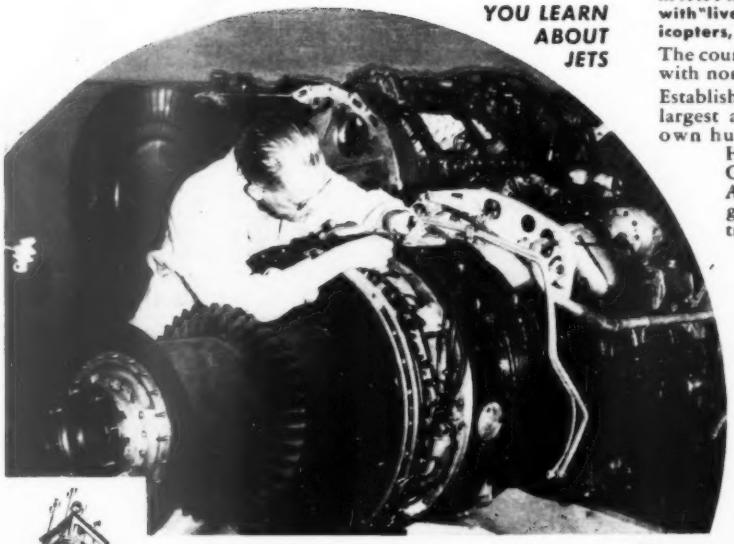
YOU LEARN ABOUT JETS



WE HAVE THE EXPERIENCE — THERE IS NO SUBSTITUTE FOR IT.

Board and room available right here on Grand Central Airport. Transportation is no problem — this saves you money

Notice — **TO CAL-AERO AND CURTISS-WRIGHT TECHNICAL INSTITUTE GRADUATES.**

Be in on our 20th Anniversary celebration — Send your name and present address to the registrar — He will keep you posted on plans.

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Check one: ☐ Veteran ☐ Non-Veteran

F-2

LOGGING TIME

WITH HY SHERIDAN

Captain, American Airlines

EVERY WRITER HIS OWN ZOO

A justly famous airline official has sent me a letter in which I am called a rat, and I have received a letter from a lady, at least a part-time lady, telling me I am a dog. You can't imagine how disappointing all this has been to me when all my life I have wanted to become a duckbilled platypus.

* * *

THREE-SHELL GAME

. . . fillip me with a three-man beetle.
—King Henry IV, Part II.
Act I, scene 1.

The neatest three-shell game, at least the neatest that has reached print, in years is the one that has President W. A. Patterson of United Airlines complaining to the carnival officials. When you're playing with Texas boys, podner, know who your dealer is.

In the fall of the year the CAA decreed that big (big at the moment, you know) airliners should have three men in the cockpit, and the ruling was finally ordered to go into effect by December 1. Mr. Patterson, who knows how to get all the advantage there is out of a bad thing, and this is bad in the sense that the third man costs money, was taken with a swell idea. He trained several hundred of the required second officers, and then just before S-Day (Surprise Day) he put display ads in the country's newspapers advertising that United, in the interest of safety, United was using a third man. The day that the ad program ended something happened.

American Airlines had been protesting the new ruling of CAA, and on that day the effective date of the order was set ahead to March 1, and most observers believe that it will never take effect. Now if President Patterson keeps the third man on he has the short end of competitive costs, but how can Pat take off the third man in the interest of safety?

When yuh reach under the table, podner, yuh had better come up with yore iron.

The editors of FLYING, in case you wondered, got taken in the same deal. They planned an article on the change and published "Third Man in the Cockpit" in last month's magazine. Ten days before press time (on Nov. 20) they carefully checked CAB to see whether it might, possibly, change its mind. CAB said indignantly, "of course not." Now when the article describing the change that didn't take place appeared on the news stands December 20, who was the liar?

* * *

No one can say that civilization has not made progress. In the old biblical days an ass spoke and they thought that it was a miracle. It is commonplace today.

* * *

IN THE WINDY CAVERNS OF THE SKULL

Your reporter has as his hobby the job of jerking the big Dizzy Sixes back and forth between New York and Chicago for the benefit of people who want to go when they want to go. On Flight 19 of November 23, 1948, one of the passengers was a big movie producer. (If he doesn't shoot the play I'm writing I'll spill his name, s'help me.)

Your reporter, pursuing his hobby as a pilot, came back through the cabin speaking to the passengers and tweaking the stewardesses in passing. In the tail of the ship sat his Hollywood eminence.

For the sake of those who haven't had a chance to fly in the pressurized airplanes it should be explained that they have air pumps for pressure and for ventilation. On the wall near each seat is a little moveable nozzle: twisted to the right it is shut off, to the left a thin jet of air is squirted out to give the passenger the illusion he is getting some ventilation.

The Hollywooden person looked up and spoke as your reporter passed. "We're going pretty slow, ain't we?" he inquired, slanting a glance out through the window at the ground that was so far below we did not seem to be moving.

"No. Quite the contrary. We have a brisk tail wind."

The producer was resourceful. He reached up his hand to the ventilator and twisted it open. He held his finger in the jet of air. His face was rueful when he remarked, "Well, we sure have, haven't we? For a minute I thought you was kiddin'!"

* * *

MONTHLY EPITAPH

He was a fine pilot (and patron of cupid)
Who gave his girl's house a bold buzz;
He was a fine pilot, but just a bit stupid:
He'd rather be is, now, than was.

How I Sell Planes

(*Continued from page* 40)

known figure in the community is to make the most of every opportunity to speak on aviation topics to local clubs such as Kiwanis, Rotary, Lions and similar service and fraternal organizations. When worthwhile films are available, arrange for community or club showings. Keep your local newspapers and radio stations posted on airport activities and work for, but don't force, special promotion cooperation. Judicious use of advertising for students or about the airport is necessary to supplement the publicity activities.

The distinctive portion of applying all these well-known truisms of salesmanship lies in using discretion and some common sense. When speech-making opportunities open up make sure that your material is interesting and be sure to avoid repeating previous speeches. If you have platform shortcomings it's best to arrange for interesting guest speakers, never forgetting that the best plug for your airport may be the one that is least forced and least obvious. Check films before you show them since some are so clumsily produced they may alienate an audience because of excessive advertising.

The card file should be used often as a mailing list for all types of promotion material. Each person's card should have a record of the type of information previously sent so that duplication is avoided. A special list of immediate prospects should receive notices of interesting cross-country group flights and these people should be invited to go along by prearrangement with plane owners who may have space. The "fraternity" of airmen has a high appeal and it should be fostered wisely.

The two prime markets for new planes at present are among businessmen who travel widely and the already established plane owners whose craft may be a year or more old. Requiring a tempered and more sensitive approach these prospects may at the same time be the easiest to talk with and the most difficult to sell. Especially important today is the businessman prospect because one satisfied customer in a territory provides the opening for others who might otherwise be hesitant.

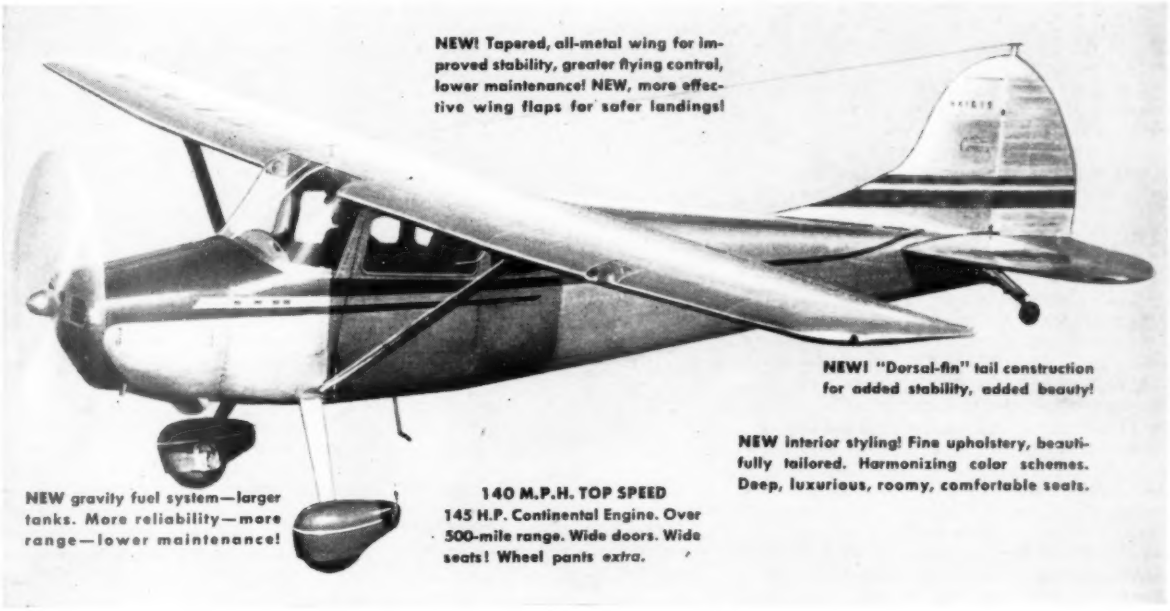
One of the pilots who uses Westchester Airport as a home base is Ogden Brower III, of North Tarrytown, N. Y., about 12 miles from Armonk. Brower is eastern factory representative for the Precise Engineering Company of Chicago, manufacturers of rotogravure presses. He is not a newcomer to aviation, having started flying in *Cubs* when he was 24 years old back in 1936. During the war he served in the RCAF and during part of his tour of duty he spent two years leading a detachment which was in complete charge of aircraft ferried over the Canadian Rockies to Vancouver, B. C. His present total of more than 4,000 flying hours includes over 1,500 in personal planes.

When his war service was terminated

Announcing

THE NEW 1949 Cessna 170

An even finer low-cost, 4-place "FAMILY CAR OF THE AIR"...ready to take you and your family anywhere on this continent. Ready to boost business profits, too!



NEW! Tapered, all-metal wing for improved stability, greater flying control, lower maintenance! NEW, more effective wing flaps for safer landings!

NEW! "Dorsal-fin" tail construction for added stability, added beauty!

NEW interior styling! Fine upholstery, beautifully tailored. Harmonizing color schemes. Deep, luxurious, roomy, comfortable seats.

NEW gravity fuel system—larger tanks. More reliability—more range—lower maintenance!

140 M.P.H. TOP SPEED
145 H.P. Continental Engine. Over 500-mile range. Wide doors. Wide seats! Wheel pants *extra*.

NEW FREEDOM! NEW FUN! INCREASED EARNING POWER! That's what this remarkable new plane offers you. You use modern production methods in your business, use modern transportation, too! You can be more places get more done, when you cruise there and back at a comfortable 120 m.p.h. And you can take customers and associates with you in this roomy, luxurious 4-place plane. And think of the places you and your family can go - the fishing, shopping, visiting, vacationing, you can do! See this ALL-metal Cessna. You and your wife can learn to fly it easily! And both price and operating costs are amazingly low!

Cessna 120-140

Roomy, 2-place, cross-country planes at light-training-plane prices! Cruise at over 100 and 105 m.p.h. Range: over 450 miles.

Cessna 190-195

Luxurious, 4-5 place personal or company airliners. Yet surprisingly economical to own and operate. Cruise at over 165 m.p.h.

CESSNA LEADS* because Cessna offers "more for your money!"

***In 1948, more people bought Cessnas than any other make of personal plane.**

USE THIS COUPON
or See Your Nearest Cessna Dealer

Cessna Aircraft Co., Dept. F-1, Wichita, Kansas.

Please send free literature giving complete description of the Cessna 170 ( ), Cessna 120, 140 ( ); Cessna 190, 195 ( ); Literature for model builders ( ).

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City.....County.....

State.....Phone No.....

Brower began flying again in a well-known conventional four-place plane. He brought it into Westchester Airport for service and that's how I came to find out that he might be interested in a newer plane that would give him more utility than the one he was using. His plane and the Stinson—one of the types handled by Westchester—compared about equally in load and range, but the Stinson had a distinct advantage in small field utility, economy of operation and one other point I discovered later.

In conversation at the airport I learned how he used his plane to make calls at printing plants throughout the eastern states as many times during a year as possible. A photography enthusiast, he utilized the plane also to make his own aerial photographs of the plants he visited and on the return trip to each he presented the professional result to the company head as part of a sales service. The Stinson had a less obstructed and wider visual range for making shots through the cabin windows than his plane.

I made an appointment for a visit to his office and brought my most potent sales literature, prepared by Stinson, demonstrating how other businessmen utilize that line. We not only discussed flying in general, but he also showed me some of the special camera equipment he uses and talked of the problems that come up in aerial photography. That's one of the places where knowing a man's hobbies is important, since it may help to learn something about them beforehand so that you'll be able to talk intelligently when the time comes.

Ogden Brower is married to a former Texas girl and they have seven-year-old twin girls named Georgie (after Mrs. Brower) and Eleanor, but for some reason now forgotten by the family, their commonly used nicknames are Dodie and Baba, respectively. I mention this, because even when attempting to sell a plane solely for business purposes I never neglect a man's family. Not only is a wife's opinion vital, but the impression you may make on the entire family may be important to the success of your sale. In Brower's case, after the visit to his office, we made arrangements for me to come to his home one evening so that he could go over the material with his wife. Knowing about the children I made sure to bring some brightly colored booklets for them to look at while Mr. and Mrs. Brower and I talked about the plane.

The next step was to have the family come out to the airport to look over a demonstrator model. In this connection there's a major warning. Make sure that the plane is absolutely clean and polished since the first impression may make or break. The Browers brought the children along—which made it possible for me to drop back occasionally out of the conversation and let the parents discuss the plane's merits by themselves.

The demonstration flight was a simple matter as Brower's flight experience was so complete that after a checkout he was able to take over the plane and fly it any way he wished. With a newcomer, or comparatively inexperienced pilot, it is extremely important that the prospect be introduced gradually to the plane's capabilities. In flight, point out the best features of the plane honestly and dramatize them casually, letting the passenger handle the plane within the limits of his skill. Never try to show off in a plane on a first flight with steep take-offs or climbs, violent maneuvers or any other such trouble making didoes, or a good prospect may be scared away. After that first flight don't be afraid to push the possible sale, but if the customer is undecided, arrange for another date in the future, even for a cross-country trip if necessary to demonstrate utility. Don't use high-pressure tactics, but don't let him slip away from you by neglecting to get in touch with him if he doesn't call you again.

After an airplane is sold the salesman has to continue his campaign, but in a different way, to keep the plane sold. The future of personal aviation depends on fliers being satisfied with the service they receive after they buy their planes, and the best place to raise the standard is at your own airport. Nothing will sour a man faster than the feeling that he's been taken for a sucker with a machine he can't seem to use enough. Show a potential customer your airport's facilities even before he buys a plane. Emphasize the types of service available to him, and if you have any one point you can be especially proud about don't be afraid to plug it, although not to the exclusion of everything else. Plan trips for the man and his family, whether business or pleasure. A salesman can't afford to stop selling his product or his airport because that's the touch that will promote another sale in the future when the time comes to trade the old plane in for a new model.

One of the biggest stumbling blocks in demonstrating business utility is the matter of transportation from airports on trips. Ogden Brower solved that one for me himself. He had learned that the British had put out a civilian version of their famous midget paratrooper motorcycle used during the war. Compact and stable, the little motorbike weighs 95 pounds, has a top speed of 35 miles per hour and gives 125 miles to the gallon. The Corgie seat and handle bars fold down, a standard motorcycle windshield fitted by Brower is taken off and the vehicle is lifted easily into the Stinson cabin and placed against one of the back seats, using no more space than that which would otherwise be taken up by a single passenger.

Ogden Brower is completely satisfied with the plane he bought. There was no pressure, no over-selling and its capabilities have been adequately brought out in his work. We had listed all his possible operations, insurance and maintenance costs prior to the sale and I had pointed these up in various ways during the visits to his office and home and on his trips to my operation at Westchester airport.

His present schedule calls for over 500 flying hours a year, equivalent to over 60,000 miles, working in and out of every type of airport, rough and smooth, big and small. If I had misled him on the type of plane for his purposes and its potentialities he would have been one customer neither I nor the airport would have seen again. My sales program satisfies everyone while it builds my market and my prospect list for the future. END

15 YEARS AGO

From the February, 1934, issue of this magazine:

The Douglas DC-1 went into service for TWA and was the "latest word in commercial aviation." The DC-1 had two 700-h.p. Wright engines, a top speed of 188 m.p.h. and seated 12 passengers.

Col. Roscoe Turner, described as the "most dashing figure on the contemporary American aviation scene," flew

around the country with a pet lion (see photo).

The Playboy, a two-place sportplane, was built by the Kinner Airplane and Motor Corporation. The *Playboy* could be converted into an open or closed plane while in flight by means of sliding panels in the fuselage. Powered with a 160 h.p. Kinner engine, it cruised at 125 m.p.h. and landed at 55 m.p.h.

Ernest Nichols, an Ohio farmer, gave a first-hand report of how he tied down the drifting nose of the Navy dirigible *Shenandoah*, after it broke in two during a thunderstorm on September 3, 1925. When Nichols saw the nose section headed directly for his house, he ran out, grabbed the trailing cable and threw it around a tree. One of his neighbors then punctured the gas bags with a shotgun. After it was all over, Nichols said, "All that time I didn't know what the thing was. Why, it was over 350 feet long."

United Air Lines straightened out its New York-Chicago-Pacific Coast airway, reducing the length of the route to 2,725 miles and the time to 20 hours. (United's coast-to-coast time now is 12 hours.)

TWENTY YEARS AGO

The new Swallow training plane, a two-placer with open cockpit, sold for $1,795 less motor and prop, flyaway Wichita.

Aviation has captured the imagination of the young men of America more than any other industry in the history of our country. It has become essential to our way of life, our national economy and our existence as a nation. It is an expanding industry that offers opportunity to the pioneer spirit of American youth. Don't be a square peg in a round hole. You can "fit" in aviation only if you have ability, ambition and *training*. There has never been a better time to get started than right now because of the great demand for trained men. SPARTAN has more calls for graduates than can be supplied.

Choose a school that can give you the most in experience and training for each dollar invested. Ask any SPARTAN graduate or anyone in the industry about the quality and extent of SPARTAN training. Make any comparison you wish and *you'll choose SPARTAN!* SPARTAN'S twenty-one years of success teaching civilians, army personnel and students from nearly every country on the globe, is your assurance of receiving the best possible training in the least possible time. *You'll not need MORE than SPARTAN training, you cannot afford to take LESS!*

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FLAT SPINS

PILOTS, WATCH THOSE WATERSPOUTS

•

SKUNKS TRAVEL THE AIRWAYS

•

HERE COMES THE HIT-AND-RUN FLYER

● **GETTING UP IN YEARS**

Walter Morgan, Fosston, Minn., farmer, parachuted 10,000 feet from a lightplane. Why? "To show the kids I could do it."

Said Farmer Morgan: "They'll have a hard time keeping me on the ground now."

Morgan is 76.

● **UP IN CLOUDS**

It's "Sky Girls"—not "Air Hostesses"—as far as an aviation company in Johannesburg, South Africa, is concerned. "We've changed the title because we think air hostess is a misnomer," the manager explained. "Who ever heard of a hostess searching for lost luggage or checking up on passengers' tickets?"

● **HIGH HUMIDITY**

A waterspout—of all things—has been blamed for the mysterious disappearance of the airliner "Star Tiger" in a flight between the Azores and Bermuda last winter. The British Meteorological Office believes the plane might have collided with a waterspout column of high rotational velocity.

● **WALKING ON AIR**

Ellen Murdoch of Greenwich, Conn., is Pan-American's first woman employee to pile up a million miles in the air. In her six years as stewardess, it is estimated she has walked the distance from New York to Moscow within the cabins of her high-flying planes.

● **FLUSHED**

Near Crowley, Tex., a bad hombre wanted for burglary was flushed by a plane, nabbed by deputies waiting nearby.

● **THE BIRD**

Birds colliding with Royal Air Force planes have caused $80,000 worth of damage annually. But that was before peregrine falcons (trained in Shropshire, England) were put on "guard duty." Now the falcons drive off birds which infest runways and rise in clouds in front of aircraft.

● **THE LOW-DOWN**

Residents of a Warwickshire, England, nudist colony complained to the Royal Air Force that their pilots swooped low whenever they came near the camp.

● **IN THE WRONG LANE**

A hit-and-run pilot was arrested at Toms River, N. J. He dived his plane down on an auto moving along the highway, smashed the car's windshield, then took off for the wild blue yonder. But the auto driver got the plane's registration number and the pilot was later arrested.

● **THE NEW ARMY**

Forty-nine very homesick but also very smart New York soldiers stationed at Camp Hood, Tex., used every possible minute of their 10-day leave in their beloved Manhattan by chipping in and chartering an American Airlines plane for $7,400 to carry them home and back to duty again.

● **GIVE 'EM THE GUN**

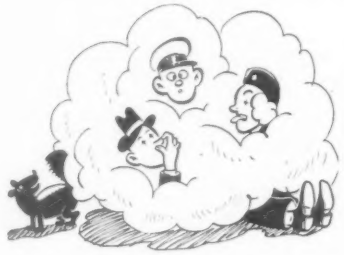
To forestall air pirates, who board planes as passengers and then hold up everyone in flight, Hong Kong police are using a "metal detector" on prospective air travelers. If you board a plane in Hong Kong, you've got to step in front of the device. It'll buzz if you're carrying armament.

● **STATISTICALLY SPEAKING**

It takes 200 man hours to build the average automobile, 50,000 man hours to build the average medium-sized bomber.

● **SMELLED TO HIGH HEAVEN**

The air express company in Brownsville, Tex., had a complaint. The skunk it had been given for shipment



had been de-scented all right. But en route it had given birth to a baby of the strictly *un*-de-scented variety.

—*Harold Helfer*

Danger Over Mountains

(*Continued from page* 33)

elevation there is nearly 9,000 feet and no ship has landed in the Park since.

At that time I considered myself an expert mountain pilot. In the 15 years since, I've concluded that I'm just beginning to learn something about mountain flying. At the present time my work for an oil drilling corporation flying a D-17-S Beechcraft requires me to cross some part of the Continental Divide or other high range almost daily.

My blood pressure rises to extreme highs when I think about a map that purports to show where to expect downdrafts and extreme turbulence. If all conditions that cause air movement (such as difference in pressure and temperature, clouds, terrain, direction of surface winds and direction of air mass movement at all altitudes, plus other circumstances) were exactly the same at all times, then we could reasonably expect to find more or less uniform air. Then turbulent spots and places to expect downdrafts or updrafts could be mapped.

A study of Rocky Mountain area weather maps will show frequent wide variations in the pressure and temperatures on opposite slopes of the Continental Divide and other high ranges. These ranges act as barriers and hold up the movement of predicted weather. Highs or lows build up rapidly along the mountains and cause conditions that make the weather forecaster's hair turn gray at an early age.

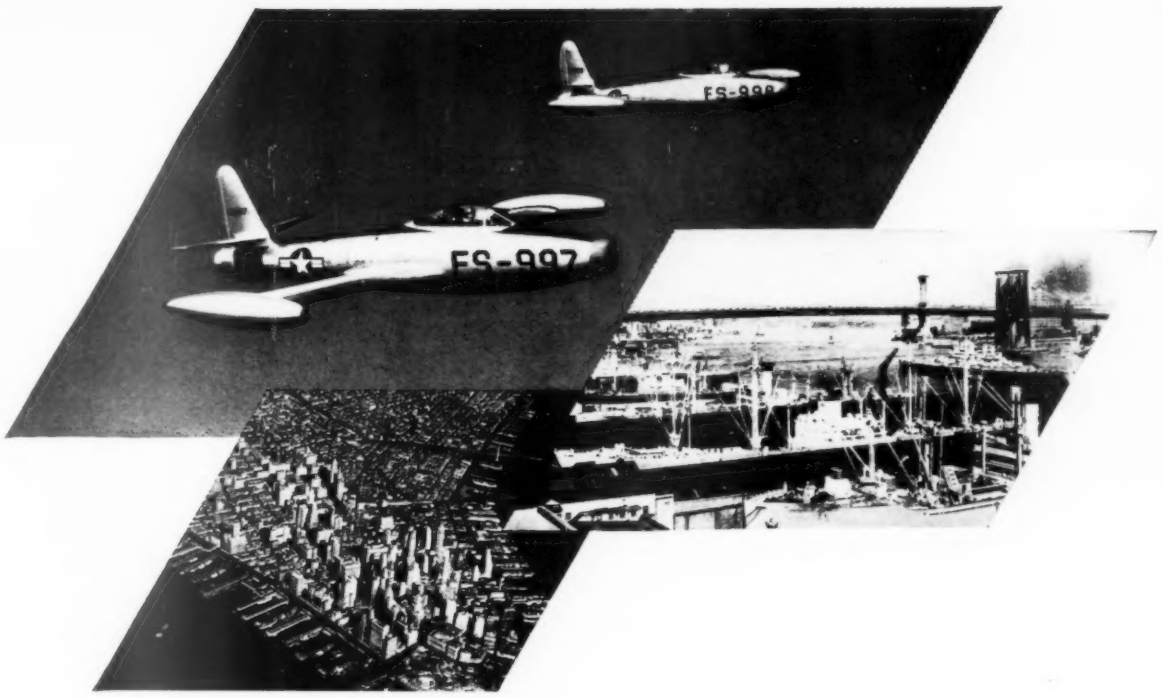
Have you ever been around airports at Denver, Albuquerque, Winslow, Phoenix or other similar arid towns on a hot day? If so, you've seen small whirlwinds or dust devils, sometimes as many as a dozen at a time. Did they all move in the same way and in the same direction? Was there one in the same place at 2 p.m. Friday that there was at 2 p.m. Wednesday? If you think so, draw a map indicating the exact spot. You'll be a big help to all pilots.

As to flying the canyons and ridges, gaily riding the ups and avoiding the downs as a recent magazine article suggests, it sounds all right. However, the catch in that one is that some of the downs may get you so low so rapidly that it will be impossible to straddle that ridge again. Incidentally, a convenient ridge is not always available when one starts to lose altitude.

A short time ago I made a flight from Denver to Farmington, N. M. The course is somewhat west of Pikes Peak and the Royal Gorge over the Sangre De Cristo Range, then across the upper end of the San Louis Valley to Wolf Creek Pass on the Continental Divide. Then a gradual letdown to the rough but lower New Mexico country.

I was flying the D-17-S Beechcraft, 450 h. p. with constant speed propeller and equipped with a small oxygen unit. This particular plane is tops for climb and control, especially when you are flying at high altitudes.

One of the things I learned long ago is



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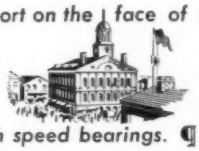
¶ Thus the Air Force assures protection to our greatest centers of population. The metropolitan area which houses the life line of two thirds of the world's financial markets . . . and the greatest seaport on the face of the earth . . . New England's harbors of the fishing trades  and inland . . . the many productive farms . . . and the heavy industries which turn out everything from cotter pins to high speed bearings. ¶ All are in turn part of the treasure trove whose safety is assured only through the growing acceptance by the American people of the vital need for a modern dominant air force . . .

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to get my altitude before going near the high ranges, so I climbed to 13,000 feet—which normally would be plenty for this trip. The weather bureau reported a strong southwest or near head wind above 10,000 feet. Otherwise, the weather was clear and seemingly perfect.

Shortly after clearing the first mountains I began to lose altitude. Increasing power to near maximum I tried to stay at 13,000 feet. The air became turbulent and as I neared the Sangre De Cristos I was down to 10,500, trying my best to locate a booster along a ridge.

I didn't want to go too near the range as it was natural to expect a real down draft on the lee side. When I had about decided to turn down the canyon and follow it out to the plains, I started up, and brother, I mean UP!

I throttled away back but the air was so rough that it was difficult to maintain control without the slipstream, so I extended my gear to keep the air speed down as I used more throttle. I was thrown and buffeted around until I marveled that even such a sturdy ship as the Beech could stay glued together.

In less than two minutes I was boosted to 16,000 feet and was streaking for the heavens like a homesick angel. After crossing the range I lost altitude just as rapidly. Everything loose was floating around the cabin or tight against the top. In practically no time I was down to 10,000 feet again.

I was unable to gain much altitude until I was nearly over Wolf Creek Pass. Then the same deal over again. Why? Head winds, updrafts on the lee side of the ranges and downs on the up slopes, when according to all the rules, the opposite should have been true.

I could go on indefinitely stating instance after instance where all the rules were wrong and where the power and performance of the airplane stood between me and a nasty crackup.

Once between Boise and Spokane over the Snake River Canyon I lost 6,000 feet so rapidly that I was nearly on the surface of the river before I regained control of the ship. Up to that time the air had been smooth and there was no reason to expect this down draft, as I had been flying parallel to the river.

Again over what is known as the Dallas Divide between Montrose and Norwood, Colo., a friend and I were flying about a quarter of a mile apart and at about the same altitude. Suddenly I started to lose altitude. In a matter of seconds I was down on the tree tops, but was able to straddle a ridge and head back into the lower valley. We had a tail wind and were not near the divide. My buddy saw me go down, but had no difficulty holding his altitude. Why? None of the rules seem to fit that one either.

I shudder to think of what the outcome would have been had I been in a light airplane.

One article to which I took particular exception, says not to enter mountain passes where you cannot land your lightplane safely in case of an emergency. Very good advice, because if you'll follow it, you won't attempt to fly through any of the passes over the Continental Divide.

I believe I could safely crash land a ship on LeVeta Pass if the weather conditions were good. But how about Combres, Wolf Creek, Corona, Hayden, Monarch, Cameron or Fall River or any other low place or notch in the range where a lightplane would have to cross?

There are no strips or large dry fields and what looks like smooth ground from the air over much of this country above timberline is in reality eroded and studded with rock outcroppings or glacial deposits that would mean disaster at sea level. Timberline is 11,000 feet above sea level and your light, slow-landing plane would come in like a clipped wing pursuit job or a satchel full of bricks.

There are meadows and clearings in most of the valleys wherever there is a stream or river extending nearly to timberline. These meadows are always wet and swampy during the summer. The snow is always deep and drifted during the winter. Most of the lakes at high altitudes are deeply covered with snow.

An auto trip up one of these valleys and over the pass will convince almost anyone that there are very few spots that could be used for landing a plane, even if you inspected the area on foot before the attempt as I did at Rocky Mountain National Park in 1932.

It is an old saying among flyers that the eagles and buzzards flying over this country hold hands so as to have twin engine performance. This may be a little far-fetched, but they *do* walk over some of the worst spots and take off on the other side.

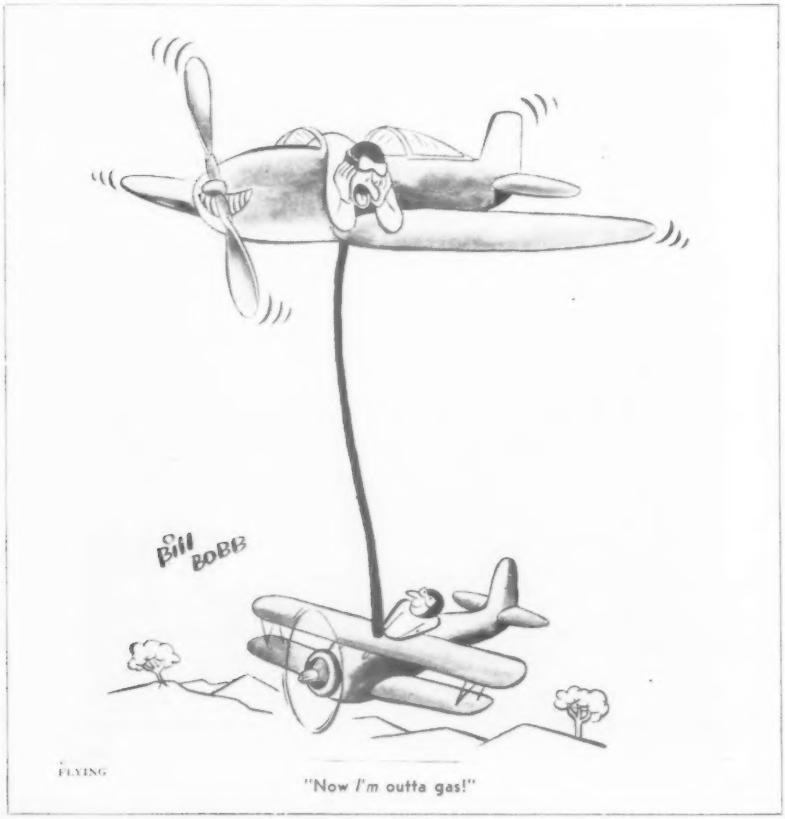
One writer says that turbulence over the mountains rarely gets as violent as thunderstorms over Kansas in mid-summer. I agree. But do you fly your lightplane into thunderstorms anywhere if you can avoid them? I've seen many in Kansas which I've given a wide berth regardless of the aircraft in which I was flying.

There are no stations making hourly weather reports except along the airways. When you're not flying the airways, it is common for thunderstorms in the summer and snow flurries in the winter to appear in the mountains where the last report was "clear and unlimited."

To sum it all up, I believe that there are days and conditions when anyone trying to cross the mountains in a lightplane is sure to come to grief in spite of all rules and advice. Certainly, there are many successful flights made in lightplanes, but there is also a long list of missing planes, a few of which have never been found.

To repeat what I said earlier in this article: To attempt to fly regularly in this area one should be positive that his ship can easily clear the highest peaks and surface air conditions directly affected by these peaks and ranges. One should also have sufficient experience to be able to take advantage of the ups and not be ashamed to scram far and fast on the days when the rules prove inadequate.

Perhaps I'm overly conservative, but it always takes some of us who are to make up the searching parties for the bold boys. END



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TRAIN IN MIAMI -- AIR CAPITAL OF THE WORLD

Pilot Takes a Physical

(*Continued from page 29*)

inquisition he sat back in his chair, smoking his cigar and taking it easy, but he made me stand up and go through all kinds of contortions. He said the reason for this was to find out if all of my joints were working, but I knew very well that it was just to touch up his sense of humor. Hell, some of the things you wouldn't do dancing. He put on his sun glasses. "Bend over," he commanded, but try as I would I couldn't touch my toes, which I think is a pointless test because in flying my DC-6 I never try to touch my toes.

He had another funny test. "Cough," he ordered. I thought he wanted me to whistle.

"Doc," I put in, trying to belittle the importance of this body I have to inhabit, "Doc, since airliners are flown with the mind instead of the muscle, don't you think that psychologists ought to test us instead of body specialists?"

"No. It would be all right but psychologists all have pet ideas that they are trying to prove, they all have prejudices. I don't have any prejudices, myself." I said nothing about this. I was told to put on my pants, and I did.

Doctor DeRenne called in one of the good looking nurses. I didn't notice her name, but that was all. "Sit down in that chair," he told me, "and the young lady will take some of your blood." She tied a tourniquet around my arm and picked up a tire pump with a needle in the end of it. I clenched my fist and when the vein popped up she harpooned it on the first cast, and then she drew out so much blood that I wondered if they intended to start another bank.

"Now," the doctor said, "we will do the Schneider Index." That is the test where you lie down awhile and relax while you wonder how you are going to feed the family if you don't pass it. The doc takes your pulse rate and blood pressure while you are relaxed and while you are standing up and again after a standard exercise which consists of using a leg and putting it on the seat of a chair and going up and down five times. And then they draw conclusions.

While lying on the cross between a table and a bed, relaxing and wringing my hands, Dr. DeRenne said, "Hy, you were kind of scared of that needle, weren't you, when the nurse took your sample of blood?"

"Shucks, no."

"You can't fool me. I saw you clench your fist."

The truth was that when that pretty nurse was bending over me I didn't have a chance to get around to getting scared; I was concentrating. In fact, I was concentrating so much that I began to wonder if I had entered my second childhood. In a moment or two I decided that I hadn't.

I wanted to tell the doctor that I had clenched my fist to raise up the vein, as I had been told to do on previous occasions, but I remembered that the doctor had no prejudices and I held my peace. A man who has no prejudices is not altogether open minded, I've noticed.

Then I got up off the bed in order to do the chair exercise, and I took a few long breaths before starting. After that part was over, the doctor observed, "Who told you that trick for lowering your blood pressure?"

"What trick?"

"Why, filling your chest. That allows the blood to pour into the chest cavity and lowers the pressure."

"I didn't know that."

Veteran Traveler

LINDA KATHLEEN COOK, daughter of a Kansas aviation photographer, Jim Cook, had logged 50 hours before she was seven months old.

She made her first official ride at the age of two weeks and slept nonchalantly through the entire trip.

When Linda and her parents flew to Austin, Texas, for a visit, people all along the way were amazed that they were taking a small baby on such a long trip. Linda's parents reminded them, however, that the trip in a car would have taken much longer and been less comfortable.

"You can't fool me. I'm on to all the tricks."

I thought I had just as well not tell him that I was simply trying to get my breath, that my blood pressure is ordinarily so low that I have to lie down to get enough upstairs to think with.

To turn the talk away from me, for if I am anything it is modest, especially where flight surgeons are concerned, I said, "That Air Force flight surgeon, Harry Armstrong, tested the Schneider Index method against controls over a number of months, and he said that it had no medical significance and they cut it out. What do you think?"

"Well," he said, "it's impressive, anyway." Impressiveness is a standard airline principle which appears everywhere except on the balance sheet and I said no more because I did not want to seem as though I did not have a good grasp of the aviation business.

We then went into the eye room. It is a long, dark room with tools in there that the inquisition hadn't even dreamed of, and at first when you go in all you can see is your finish.

I sat down in a chair. The doctor turned a switch and a tiny light on the far wall lit up. "I can see it!" I cried, happily. I was just a mite premature. Dr. DeRenne pulled up to me a formidable apparatus composed of gears and prisms, and he had me put my eyes up to it. "Tell me when you see two lights." He twisted a knob. I waited what I considered a proper length of time while he twisted, and then I hollered, "Now!" as I habitually do when I see double. I had waited the right length of time, all right, because I could see by the disappointment on his face that there was nothing here for him to advise me about.

Then he began twisting the knob the other way and when he began to frown, I cried, "Now," again. Right on the button once more. With those prisms first he makes you cross-eyed and then he makes you cock-eyed and so far as I am concerned this is the poorest way to do it.

He pulled out a little card with very fine printing on it, and the purpose of this test, besides giving the doctor something to do, is to find out if you can see up close without reading glasses. I thought that I had better start thinking of some self-defense because a good many years have rubbed over me and I am no longer pink where that first doctor I ever knew whopped me. "Doctor," I began, "I should like to interview you, you know, and . . ."

"What do you see?" he demanded, implacably, whatever that is.

"Nothing interesting," I replied. "I can write better stuff than this, myself."

"You have presbyopia," he pronounced.

"No, I'm an agnasty," I claimed, but he put it down on my chart as presbyopia anyway, although I couldn't see how it would do me any good because a man without religion is likely to be a safer pilot; he is likely to be pretty careful about remaining on this swimming sphere as long as possible not being sure about any other one to come.

The next test involved me and two

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black sticks in a box. The box is lighted and you look at the two sticks through an opening in the front of the box about 20 feet away from you but you can't see the top of the sticks nor the bottom of them. The doctor passed me a long loop of twine. By pulling on one line I could move one of the sticks forward, by pulling the other line I could move it backward. The job was to get the two sticks exactly abreast. The doctor looks at a scale in the box and he puts down how far off I am on each of the trials.

"Doc," I complained, "in the aviation business when would I have to line up two sticks, tell me that?"

"That's for depth perception. You can't land an airplane if you don't have depth perception."

"But doc, my psychology books all say that you don't, you can't have any depth perception beyond 20 feet. When you land an airplane, especially the big ones, why you have to look at least 100 feet ahead, maybe a good deal more."

"Well," he replied, for he is never at a loss for an explanation, being an old well-trained married man, "when you are landing you swing your head right and left, right and left, to increase the base of your triangle. You don't depend upon the little distance between your right and your left eyes. The next time you come in to land, watch your co-pilot and you will see him doing it."

Now, if the gentle reader will permit, I should like to do a flash-forward, a decided improvement over the Hollywood technique of the flash-back. The next trip I flew after the physical examination I watched my co-pilot's head as I made the landing and much to my astonishment I saw him throw his head from side to side, although I certainly was not conscious that I had been doing it myself. I thought I would impress him by giving him the scientific low-down on the phenomenon so I asked him why he was doing it. "Me? I wasn't looking at anything," he said. "I was just thinking about your landing technique, since you up and asked me." Oh, well.

"You can do better with the sticks than that, Hy. Practice a little and I'll be back in a few minutes," and the doctor went out. I practiced a little but I didn't do any good, so I just sat and thought and I didn't do any good with that, either. The doctor came back, and I thought that it was queer that he was chewing gum, being a cigar man. He picked up the strings. The room was dark except for the lighted box. He walked slowly toward me and handed me the strings for the second run. This run was mighty near perfect because I didn't look at the sticks at all—I just noted the rhythm of the doctor's chewing as he stood and watched the sticks approach each other.

"Doctor," I said, trying to get my interview, "do any of the boys ever try to fudge a little on this test; have you run into any trick artists?"

"Sure. That's why I always go out of the room for a while, to give them a chance to set up something. Some fellows tie a couple of little knots in the string and in the dark they line up the knots by feel. Well, when I come back in I feel the strings as I walk up to hand them to the pilot, and I have learned to untie a knot and tie another pretty quick. Some fellows try to put a couple of specks of gum on the strings, so I chew gum. I make it tough on them when they try to fool me; nobody can fool me in this work." We were both sweating when we left the dark eye-room because it was mighty close in there, or thick.

We next went in to the ear room and left the door open in order to get some ventilation. "Light up a cigar, Hy, and make yourself comfortable," he invited, and I did, that is, I lighted the cigar. It seemed good. We sat down. Between us was a box looking like a large table-model radio, and there was a big muff that was an ear phone for one ear, like the double ones we use in the airplanes but sound-proofed around the rim.

I would put the phone to one ear and the doctor would push a button on his side and I could hear a musical note of a certain pitch. With a knob he would cut down the volume until I couldn't hear it any more and I was supposed to tell him so at once. It was hard to tell whether I still heard the note or just my memory of it. Then he would turn up the volume again until I could hear it once more and I would tell him when I was first aware of it. We tried it on all of the pitches from low to high, and then used the other ear and ran through it again. From the reading on a dial on his side he put down dots on a card and when he connected the dots with a line he had a contour of my hearing in each ear, or at least a contour of when I sang out.

We must have been an interesting sight sitting there naked above the waist except for the garlands of tobacco smoke. Cigar ashes riffled down through the thicket on the doctor's fertile chest and I was reminded somehow of Bridal Falls.

Down the hallway to us came the chatter of many specimens of the hungry or female sex. "Doggone it," the doctor exclaimed, "a bunch of new stewardesses I got to examine." His cigar took a new angle, though, and I somehow doubted the sincerity of his misery.

We had just finished with my left ear when one of the new girls walked down the hallway. She was going slowly when she glanced in the doorway and saw us. "Yip," she cried, and skittered along back whence she came, as the authors say.

The doctor removed his cigar. "Too highly sexed."

"What makes you say that? You don't know her?"

"Didn't you see how she glanced away instantly? Holding herself in."

"Maybe she was just startled. We must have looked naked to her."

"Holding herself in. The shy ones are the most highly sexed. A doctor gets to know that. And the pretty ones, too. When Mother Nature gives a girl mighty near perfect equipment she makes cunning provision for the duplication of it." Now he tells me, at my age.

When we had finished with both my ears, the doctor showed me the card with

my hearing contours on it. "You see, you are deafer in the right ear than the left. That is the way with all the captains, while with the first officers it is the other way around. I'll tell you why. The captain sits on the left and he pushes the phone up a bit off his right ear so he can hear what the first officer says to him, and with the first officer it's off the left ear, the one nearest the captain. It's the noise of the propeller that deafens you."

"But doctor, the cockpits have been pretty quiet the past few years, on the newer airliners. It's the radio static that knocks your ears off. All you have to do is fly 'em a while, or get decibel readings to prove that."

"No, you're wrong. I got that hunch some time ago and since then the ear cards have borne me out."

"But the ear cards are based wholly on what the pilot tells you he hears."

"Not at all. I know what he can hear and what he can't, no matter what he says."

The doctor got up and put on his shirt. "Oh, I almost forgot. I want you to leave a specimen for the nurse." And he handed me a beer glass. I glanced up to see if he were indulging in some of his subtle satire, but I couldn't be sure. He noted the expression on my face and went on, dropping into his suave bedside manner, "We don't want any sugar, do we?"

"You better get some homely nurses, then," I advised him.

The doctor picked up his stethoscope and flexed his muscles. He was going in to examine the new class of sweet young things, I knew, and as he left me he told me to go into still another room. "One of the nurses will give you the last test."

I went into the room and the nurse there told me to lie down on the bed. Sitting on wheels was another big electrical box with a lot of dials and jiggers and things. The nurse rubbed salt salve on my bare leg and on my arm, and then she brought over two electrodes from the machine and bound them to the salt spots.

"What are you going to do now?" I asked.

"I am going to take an electrocardiogram. That measures the voltages generated by your heart when it beats and tells us how it is ticking."

"Hm," I replied. "At first I thought you were going to charge my batteries."

"Oh, nothing like that," she laughed.

She was wrong, though.

That was all. The tests were over. I was no longer the center of attention, and I shuffled along toward the exit. As I passed one of the closed doors I heard a girl's voice say, "Oh, doctor." No wonder there is no dearth of flight surgeons, in the aggregate, that is.

All at once I realized that I hadn't gotten my interview. I had missed my story. Well, never mind. I was in good physical condition, and I felt in my pocket to see if I had enough wampum with me to begin a little dissipation right away. END

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EXPRESS ELEVATOR DOWN

ON THE MORNING of November 26, 1947, Herb Fisher—a Curtiss-Wright test pilot—took off in a C-54, imbued with the "now or never" spirit of a long line of aviation pioneers.

His entire crew had volunteered for a hazardous mission in the interests of aeronautical progress. They were going to be the first men to reverse four props in flight.

But they didn't just go up to altitude, reverse all four fans and pray. The problem was approached with extreme caution.

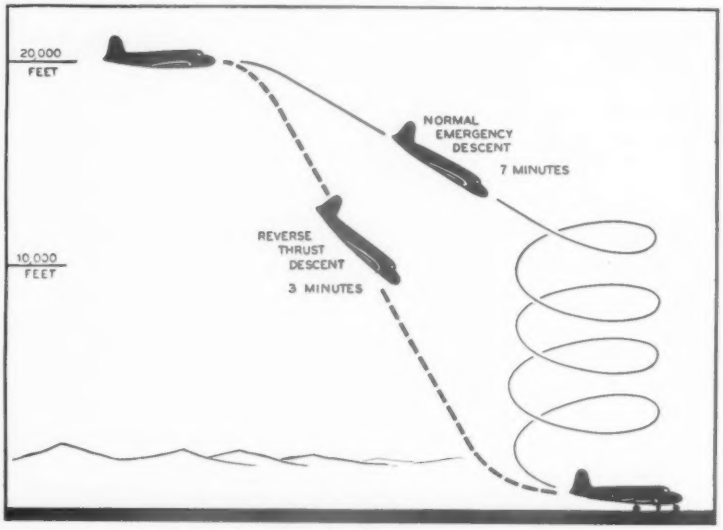
At 15,000 feet, they were ready for the big moment. Earlier experiments had taught them to reverse the props while engines were at idling speed, then open all throttles. Simultaneously, they put the nose down—for the plane would stall out in no time.

The big Douglas seemed to stand on its nose—at an angle momentarily of about 25°. In an ordinary plane, such an attitude would begin to wind up airspeed at an alarming rate.

This was different: Airspeed stuck at 175 m.p.h. indicated. Fisher edged the nose up cautiously, finally hitting a glide angle of about 15° to produce a rate of descent of 7,000 feet per minute—with perfect control and airspeed at 175 m.p.h.

Recently, a demonstration C-54 descended 14,000 feet in 82 seconds. Most existing four-engine planes descend at 3,000-4,000 feet per minute.

While reversible props on new transport planes aren't heavy enough for similar use, the new Curtiss-Wright reversible props will be available for commercial airlines in about a year. With them, airliners should be able to descend at express elevator speeds.—**Jeff Lyon.**



Comparison of descent times shows that reversed-props make letdown twice as fast.

Clark Field

(*Continued from page* 20)

vance reconnaissance. General Brereton's answer on that point was: "At the first conference, General Sutherland approved my plans for an attack immediately after daylight, instructed me to go ahead with preparations and that in the meantime, he would obtain General MacArthur's authority for the daylight attack."

It is difficult even to establish the chronology of events for that morning or to give anything more than the approximate time of those events on which agreement exists. The most detailed general account is that of Brereton, and for much of the detail given by him there exists independent corroboration. On the main points at issue, moreover, support for much of his account is provided without complete agreement by a file of the daily Summary of Activities of the Headquarters, Far East Air Force, extending from December 8, 1941, to February 24, 1942, when General Brereton relinquished command in Java on the eve of his departure for India to assume command of American air operations in that area. These daily summaries leave little question that they represent a detailed record compiled closer to the events described than any comprehensive account known to exist. In this account of the events of those first few hours they have been weighted accordingly.

After his early morning report to General Headquarters, General Brereton stated that he returned to his own headquarters at Nielson Field under instruction to take no offensive action until so ordered. The Summary of Activities for that date has as its first entry the following notation: "0715 General Brereton visited No. 1 Victoria and requested permission of General MacArthur to take offensive action. He was informed that for the time being our role was defensive, but to stand by for orders." And at 0900 appears this entry: "In response to query from General Brereton a message received from General Sutherland advising planes not authorized to carry bombs at this time."

The second of these entries is probably to be interpreted in the context of developments occasioned by an impending enemy attack. While air force officers awaited orders, the aircraft warning service had reported enemy aircraft proceeding south over Lingayen Gulf toward Manila. All B-17s at Clark Field were ordered into the air without bomb load to avoid being caught on the ground and were instructed to patrol the waters off northern Luzon. The 20th Pursuit Squadron, also based at Clark, was dispatched to intercept the approaching formation, and at Nichols Field, the 17th, under command of Lieut. Boyd Wagner, received orders to cover Clark.

At 0910, Col. Harold H. George, chief of staff, V Interceptor Command, reported to headquarters "that there are 54 airplanes in the air and 36 airplanes in reserve and that no contact with hostile aircraft has been made." At 0923, he reported "approximately 24 bi-motored en-

emy bombers near Tuguegarao and 17 near Baguio." Simultaneously, another report indicated that "Tarlac and Tuguegarao were being bombed." Planes of the 20th Pursuit had expected to make contact with the enemy north of Manila over Rosales, but the Japanese escaped interception by swinging east to direct their main effort against Baguio, summer capital of the Philippines.

Following this attack, Brereton by telephone renewed his request for authority to take offensive action. According to the Summary of Activities the time was 1000, and the "Chief of Staff informed General Brereton that all aircraft would be held in reserve and that the present attitude is strictly defensive. General Brereton stated to General Sutherland that if Clark Field were taken out we could not operate offensively." To the same entry is appended: "Bomber command recommends bombs not be loaded at this time due to danger of extensive damage by enemy air action." At the same hour but under separate entry appears this brief notation: "24 enemy bombers reported in Cagayan Valley proceeding south in direction Manila."

It is General Brereton's recollection that shortly before 1010 he received authority to undertake a reconnaissance mission to Formosa; that Lieut. Col. Eugene L. Eubank, bomber commander, promptly took off from Nielson for Clark Field to assume personal direction of the preparations; that Colonel Eubank on his arrival at Clark recalled the bombers from patrol to prepare for the execution of orders which called for three planes to fly the reconnaissance mission "and the rest to be briefed for an attack;" that, at about 1100, GHQ authorized bombing missions; that he then instructed Eubank to load all available B-17s with 100- and 300-pound bombs and to brief the crews for attack of airdromes in southwest Formosa; and that he ordered the two squadrons of bombers at Del Monte to move their B-17s at dusk to San Marcelino, a pasture-like emergency field lying near the coast of Luzon west of Clark, whence they were to proceed during the night to Clark Field as a staging point for a mission at daybreak.

It is with more than ordinary interest, therefore, that one reads the following entries in the daily summary:

10:10 Colonel Eubank left for Clark Field to take charge of operations from Clark Field with instructions to dispatch a photo reconnaissance mission in force at once to southern Taiwan area.

10:14 General Brereton received a telephone call from General MacArthur. General Brereton stated that since the attack was not made on Clark Field that bombers will be held in readiness until receipt of reports from reconnaissance missions. Lacking report of reconnaissance, Taiwan would be attacked in late afternon. The decision for offensive action was left to General Brereton. All bombers were ordered to arm and be on alert for immediate orders.

10:20 Report of planes coming south proved erroneous. Planes reported coming south from Cagayan Valley turned around and are now proceeding north. The staff was called in and informed of General Brereton's telephone conversation with General MacArthur. General Brereton directed that a plan of employment of our Air Force against known airdromes in Southern Formosa be prepared.

10:45 Employment of Air Force directed by General Brereton as follows: Two (2) heavy bombardment squadrons to attack known airdromes in Southern Formosa at the latest daylight hour today that visibility will permit. Forces to be 2 squadrons of B-17's. Two (2) squadrons of pursuit to be on the alert to cover operations of bombardment. Pursuit to be used to fullest extent to insure safety of bombardment. Two (2) squadrons of bombardment to San Mencilino (sic) at dusk. To Clark Field after dark prepared for operations at daybreak.

11:10 Report received from Clark Field that airdrome had not been bombed.

11:20 Field Order No. One, confirming Colonel Eubank's instructions to 19th Bombardment Group sent by teletype.

It required some time to bring in all of the bombers from patrol, but shortly after 1130 all American aircraft in the Philippines, with the exception of one or two planes, were on the ground. Recently recalled B-17s at Clark were being made ready for the Formosa mission; planes of the 20th Pursuit Squadron at Clark and of the 17th at Nichols had returned to their bases for refueling; those of the 3rd at Iba, the 21st at Nichols, and the 34th at Del Carmen stood ready to take off upon receipt of orders.

And just about this time the plotting board at Nielson Field began to receive reports of a formation of enemy aircraft coming in over northern Luzon. Unlike other flights reported that morning, this one did not break up as it proceeded south. Warning was sent to Clark Field by normal teletype channels, and according to Col. A. H. Campbell, then chief of Aircraft Warning Service, its receipt there was confirmed. Back at Nielson, an entry in the Summary of Activities reads: "1137 Operations Board report flight of enemy planes, number unknown, now located about 70 miles west of Lingayen Gulf, headed south 1127 a.m."

As soon as the enemy force was believed to be within operating range of American pursuit planes, Colonel George of V Interceptor Command took necessary steps to provide protection for vital points. For the approaches to Manila, the 17th Squadron was ordered to cover Bataan peninsula, the 21st to patrol the Manila area itself, and the 34th to provide a cover for Clark Field, where the 20th, just in from patrol, was being refueled. The 3rd Squadron, at Iba, was dispatched on what proved to be a fruitless flight over the South China Sea, where an enemy formation had been reported.

From this point on, a confused record reflects chiefly the general confusion and bad luck which attended the American air effort on that first day of hostilities in the Philippines. The Summary of Activities for Headquarters, Far East Air Force, notes: "11:56 General Brereton communicated with General Sutherland and complete report was given General Sutherland of the air situation at this time including fact that it was planned to move the B-17s now at Del Monte to San Marcelino and to bomb Taiwan fields at late afternoon today."

Then the summary jumps to 1240 to record a report that "10 planes, 6,000 feet, nationality unknown, headed for Manila. This information from the Navy." Under 1255 appears another report that "large force of planes, about 25, heading south

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reported in vicinity of Tarlac at 12:25." Then: "13:00 Reported by G-2 that Fort Stotsenburg is being bombed;" and again "13:00 Report received from Stotsenburg many bombers very high bombed Clark Field at 12:35 p.m."

It is not even certain that the record thus provided clears up the much debated question of just when the Japanese attack on Clark Field began, for there is rather specific evidence which argues for a time some 15 minutes earlier. No clarification, moreover, is provided for the controversial question of why our bombers were caught, apparently without warning, on the ground.

There is reason to believe that a warning message had reached Clark Field, but the warning evidently was not received by bomber personnel there. In response to a specific question from the Air Historical Office which indicated the existence of information that a warning had been sent and acknowledged by Clark Field, General Eubank under date of August 5, 1947, made the following statement:

> Information of the Japanese formation which attacked Clark Field about noon 8 December 1941, was not received by the Bomber Command prior to the attack. The formation was almost directly overhead at the time the air raid warning siren was sounded and the bombs began exploding a few second thereafter. One or two false air raid warning messages had been received earlier in the day.

And there the question must be left. Colonel Campbell is emphatic in his recollection that a prior warning was both sent and acknowledged; General Eubank is equally emphatic in stating that no information reached V Bomber Command.

In any case, the Japanese enjoyed the good fortune of catching the two squadrons of B-17s on the ground at Clark Field. This had been the enemy's hope, but after a postponement of several hours, he had no reason to expect anything other than that the Americans would have been completely alerted by the news from Pearl Harbor. Actually, not only did he find all save one of the Clark Field bombers on the ground, but for the moment the field was almost unguarded by pursuits.

A thick haze of dust at Del Carmen had delayed execution of orders to the 34th Squadron for cover of Clark Field, and at 1215 the 20th Pursuit, whose planes had not yet completed their refueling, was hastily ordered to cover its own base. Within five minutes four planes had taken off, but just then a V-shaped formation of 27 Japanese bombers attacked the field with bombs varying in size from small fragmentation to 100-pounders. Following this formation came another of comparable size, which continued the attack for 15 minutes. And almost before the last bomb had been dropped, Japanese fighters swept in to pick out the grounded American planes in a low-altitude strafing attack that lasted more than an hour.

Though every advantage lay with the attacking enemy, desperate attempts were made by the 20th Pursuit Squadron to get its P-40's into the air. Five were smashed by bombs while taking off; five more were destroyed in strafing attacks, but Lieut. Joseph H. Moore, squadron commander, succeeded in leading three others into the air.

There Lieut. Randall B. Keator attacked a flight of three enemy pursuits and shot down the first Japanese aircraft over the Philippines; Lieutenant Moore in a series of dogfights destroyed two others. At Del Carmen Field, some 15 miles away, pilots of the 34th Squadron, on seeing great clouds of smoke and dust billowing up from Clark, immediately took to the air in their P-35s to engage other enemy fighters. The P-35s were consistently outmaneuvered and several were seriously damaged, but the pilots claimed three enemy craft on return.

Deluxe Washing

JAMES O. ANDERSON of Santa Monica, Calif., heard pilots complaining: "You can't get a decent wash job for a plane . . ." "Nobody's able to put out a good wax job . . ."

That was all Anderson needed. He built a concrete slab at Culver City Airport, hired two men and was in business—washing, waxing, polishing small aircraft.

He opened on July 15, has been busy ever since. With Anderson, plane washing and polishing is not haphazard; it's a science. For wash jobs, he charges $4.50 for two-placers, $6 for four-placers, and $10 to $12 for larger planes.

Waxing and polishing (including a wash job) is $20 to $25 for two-placers, $30 to $35 for four-placers.

Anderson also specializes in a process for removing corrosion and brightening metal. Properly treated, even badly-corroded planes appear to be just off the assembly line, he says.

Two B-17s were off the ground during these attacks. One, piloted by Lieut. John Carpenter, was on reconnaissance and landed at Clark Field after the raiders had disappeared. Another, commanded by Lieut. Earl Tash, had arrived over Clark Field from Del Monte during the height of the low-level strafing to be pounced upon by three enemy pursuits, but Tash managed to pilot the severely damaged B-17 back to Del Monte.

Meanwhile, the planes of the 3rd Squadron returning from their search over the South China Sea, where they had found nothing, had run into the worst possible luck. With their fuel dangerously low, the P-40s, which numbered perhaps 12, reached their base at Iba just ahead of a heavy enemy attack. The American planes, in fact, were slowly circling the field preparatory to landing when a number of Japanese bombers, estimated at from 27 to 34, and their fighter escort attacked.

The American planes tried to ward off the Japanese attack and succeeded in preventing the low-level strafing which proved so destructive at Clark Field. Lieut. Jack Donalson probably destroyed two of the enemy planes, but five P-40s were shot down and three others crash-landed on near-by beaches when their fuel gave out.

As the enemy planes returned to their Formosan bases, it was clear that they had won a tremendous victory. Desperate attempts at defense from the ground had been futile. At Clark Field, high-level bombing had destroyed hangars, shops, mess halls, barracks, and supply buildings. The communications center had received a direct hit which cut off the field from other points, and prevented any attempt to control pursuit operations.

As a result, planes of the 17th and 21st Squadrons continued their assigned patrols of the Bataan and Manila Bay areas, unaware of the Japanese attack being carried out no more than 60 miles away.

The B-17s, in spite of being incompletely dispersed, suffered relatively little damage from bombs, but enemy pursuit pilots had so systematically chosen their targets that 17 or 18 of the bombers were destroyed. Damage at Iba was, if anything, even more severe. Of the 3rd Squadron's P-40s, apparently only two escaped destruction. Bombs crashed into barracks and service buildings. Much of the airplane maintenance equipment was lost, and with it the entire radar installation. Ground crews, who had thought the approaching planes friendly, suffered heavily.

A bombing attack on Nichols Field in the early morning of December 9 created still more havoc. Bombs fell on a hangar, damaging several planes and destroying at least one B-18. Several pursuit planes had been ordered off the ground for night patrol, but inadequate facilities and almost impenetrable dust at the field resulted in the loss of two or three of these planes and one pilot.

In less than one day of hostilities the strength of the Far East Air Force had been reduced by half. Of its 35 B-17s, not more than 17 remained in commission. About 55 of the original P-40s had been lost either in combat or on the ground. Of the P-35s, no more than 15 were operational, and perhaps 25 to 30 miscellaneous aircraft—B-10s, B-18s, and observation planes—also had been destroyed. Casualties were comparably heavy. At Clark Field alone, 55 officers and men had been killed and more than 100 wounded, to which numbers were added approximately 25 killed and 50 wounded at other points.

The Japanese had won a second great victory. It is less often remembered by the American public than is Pearl Harbor. But as far as U.S. air power was concerned, the results were equally disastrous. END

Battle of the Airlines

(*Continued from page 25*)

air shipping profitable.

The basic idea was sound. Though many fly-by-nights failed, companies with a knowledge of transportation history and good operating methods found their traffic soaring. For example, Slick Airways, the largest of the all-freight carriers, which began operations in March, 1946, flew more than 11,000,000 revenue ton-miles of freight in its first 10 months of operation.

As the freight business boomed, it became the subject of increasing controversy. The all-freight lines, which had started operating as contract carriers, found their operations hampered, sought certification as common carriers from the CAB. But meanwhile a number of scheduled airlines had started their own all-freight services. Though their top managements did little to help the cargo departments develop these services and were admittedly oblivious to the potentialities of air freight, they protested vehemently that the "competition" of the all-freight lines would undermine the whole air transport industry.

To generate the volume of business they wanted, the all-freight lines had set their rates as low as they could with a reasonable hope of realizing a profit. Though profits were not immediately forthcoming, volume was increasing substantially. Reluctant to see this new market exploited by others, the leading freight carriers among the scheduled airlines slashed their rates drastically in August, 1947, to compete with the all-freight lines. The effect was to swell the business of both groups. The following month Slick reported a profit for the first time since its founding, and freight revenue of the scheds soared.

But this happy state did not last long. The lines in each group seemed more anxious to get the business of their competitors than to develop new business. Though costs of gasoline and other items were rising, further rate reductions were introduced in the fall. General cuts by seven certificated lines were suspended by the CAB, but special low commodity rates were approved for items in which traffic was heaviest. A rate war raged, with everyone losing money. The certificated lines accused the all-freight lines of disrupting normal growth of air freight by operating below cost. The all-freight lines retaliated that they had been forced to operate below cost by cut-throat rates of the scheds, who did not even know what their freight costs were.

Finally, in April, 1948, CAB stepped in with a temporary minimum rate order, based largely on recommendations of Slick. Endorsing the principle that carriers should not operate below cost except for developmental purposes, this established minimums of 16 cents a ton-mile for the first 1,000 ton-miles and 13 cents for each additional ton-mile in any shipment.

Another argument between the two groups has been the place of the freight forwarder in air transportation. When the all-freight lines were first started, they relied heavily on freight forwarders to develop traffic, much as the charter passenger lines relied on travel agents. Surface freight forwarders have long been established as indirect carriers who consolidate small shipments into large ones, taking responsibility for their transportation from door to door. They make their money by taking advantage of differentials in rates between shipments of various weights, sometimes sharing these savings with the shipper and generally relieving the shipper of transportation worries. But when they attempted to do for air transportation what they had done for surface transportation, they met two big obstacles.

One was the CAB, which held that they could not operate as indirect carriers without its approval—and failed to grant its approval. Though a number of forwarders stopped handling air shipments altogether, many figured out ways to get around the Civil Aeronautics Act. These were immediately confronted with a second obstacle—the hostility of the scheduled airlines, who refused to quote any rate breaks for shipments between 100 pounds and 16,000 pounds.

The scheduled airlines contended that the advantage of consolidating rail shipments into carload lots cannot be duplicated for air shipments, that forwarders are more likely to retard delivery than to expedite it. The all-freight lines, on the other hand, held that they are helpful both to the carriers, for whom they develop business, and to the shipper, for whom one agency will handle all shipments, arranging for trucking, fastest routing, and connections with other carriers.

In September, 1948, the CAB made a temporary decision in this case, too, permitting letters of registration to be issued to air freight forwarders for a trial period of five years. This decision is currently being appealed by the certificated airlines. Nevertheless, many of them are including liberal rate breaks in new commodity tariffs.

The big issue, of course, is whether all-freight carriers should be granted permanent permission to continue their operations. In their applications to the CAB they present cogent arguments for their certification as scheduled operators. Basically, their claim is that they have pioneered a new type of air transportation which they are able to offer more efficiently and more economically than the certificated airlines, whose chief concern is still the passenger business. Whereas the certificated airlines thought of air freight at first only in terms of small shipments which would fill up the nooks and crannies of passenger planes, the all-freight lines conceived of air freight from the beginning in terms of volume shipments which would move in all-freight planes.

Concentrating on freight eliminated much expensive overhead necessary for passenger operations, and concentrating on large shipments decreased handling costs per pound. In addition, operating only between high volume shipping cen-

END

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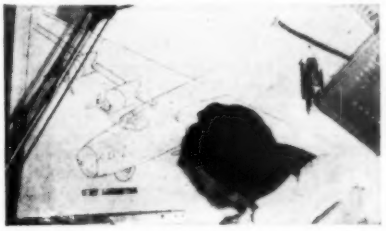

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ters kept overhead for station maintenance down to a minimum.

The certificated airlines, on the other hand, have consistently opposed the applications of the freight carriers, on the ground that no one has proved that their operations will foster sound development of the country's air transportation system. The freight carriers, they argue, have already hurt the industry by forcing freight rates down too quickly to attract traffic; instead, they ask to be allowed to develop air freight gradually and exclusively, promising to do so to the fullest extent. They take particular issue with the all-freight policy of flying only the heaviest traffic routes, claiming that they perform a far greater public service because they serve over 400 communities. After considerable study the CAB's examiners last March reported in favor of certificating six of the largest all-freight carriers: the Flying Tiger Line for northern transcontinental routes, California Eastern Airways for middle transcontinental routes, Slick Airways for southern transcontinental routes, U. S. Airlines for southeast-midwest routes, Willis Air Service for an east coast route, and Airnews for a Texas route. They further recommended that a route structure designed exclusively for cargo service be established, that routes be certificated on an area basis, that carriers be allowed to give rate breaks, and that no all-cargo carrier be authorized to carry mail.

Strongly-worded exceptions to this report were immediately filed by the certificated airlines, and a rehearing of the whole case requested. Matters were further complicated when Cal Eastern suspended operations in May. This left Slick and the Flying Tigers as the leading domestic freight operators. The case then dragged on until October, when it was reopened so that the CAB could obtain further operational and financial data. A decision in the case will probably be made early this year.

Decision in the air-coach case probably will not come until considerably later, however. Here the issues are much the same as in the freight case though they have not attracted so much attention until recently.

It is small wonder that scheduled airlines resent the special exemptions granted to irregular carriers. They themselves are strictly regulated by the CAB, have had to prove at great expense that the public convenience and necessity require their services over each route that they fly, whereas the irregulars are exempted from such regulations. As with freight, they provide service to many medium-sized cities along their routes while the irregulars serve only the largest with the biggest traffic potential. All in all, they must cope with infinitely more Government red tape.

But it is hard to follow the logic of the scheds when they accuse the irregulars of destructive competition—especially after increasing their own fares another 10 per cent last summer. Actually, a survey conducted during the summer by Standard Air Lines, one of the large irregulars, showed that only 5 per cent of its passengers had used air transportation previously for traveling long distances. If air-coach service had not been available, about 70 per cent would have gone by auto, bus or rail, 20 per cent by scheduled airlines, and 10 per cent would not have traveled at all.

Whereas the scheds charge the irregulars with responsibility for skimming the cream of the traffic, the irregulars reply that passengers should not have to pay for more than the cost of the service they receive, plus a reasonable profit to the carrier. This, they argue, is sounder economics than the certificated lines' practice of supporting "unprofitable routes through charging excessive fares over what should be profitable routes." Such support should come, instead, through mail pay, they contend. A few non-mail certificated airlines, they believe, would furnish a standard for gauging proper costs, which "would result in immeasurable benefit to air transportation generally, to the Government which in part foots the bill, and to the certificated carriers themselves by forcing them to operate economically and, as a consequence, enabling them to furnish more transportation at lower rates."

The present status of irregular carriers is becoming increasingly untenable. Under their letters of registration they are prohibited from giving "regular" service, which has been interpreted as flying more than 10 round trips between designated points during one month. This means that, as demand for their services increases, they cannot expand their operations in the most economical way. While attempting to offer low-cost air transportation to the public for the first time, they are denied the most obvious means of cutting costs. Indeed, even their use of travel agents is under question.

One suggestion for a temporary solution of the air-coach problem comes from Air America, a transcontinental line flying DC-4s. In a brief filed with the CAB, it requested a specific exemption permitting it to engage in scheduled air transportation of passengers, without mail pay, on certain routes for a limited period to enable it to demonstrate the need for such service and to help in "determining the proper and attainable costs incident to honest, economical, and efficient air transportation." Service on the most popular routes would be on a limited basis—perhaps 18 round trips a month—and service on less popular routes on an unlimited basis. CAB denied this petition.

Meanwhile, a few of the more astute scheduled airlines have recognized the inherent merits of the air-coach idea and are adapting it to their operations. Pan American Airways started the ball rolling in September by offering a daily tourist service between New York and Puerto Rico for $75—a reduction of over 40 per cent from the regular fare. They use DC-4s which seat 64 passengers instead of the usual 52, and only box lunches are served. Capital Airlines followed in November with coach service between New York and Chicago, to open up "a new mass air travel potential that just is not possible under present first-class rates." The cost is $29.60, as compared with the railroad coach fare of $27.30 and the regular airline fare of $44.10. In another move to set up different classes of service, Trans World Airlines has reduced round-trip fares on all twin-engine flights by 15 per cent.

Whatever decisions are finally made concerning the non-certificated airlines, it is obvious that second-class air transportation has shown that it can compete with rail service and is here to stay. The pioneering all-freight lines have given the public a new type of cargo service which has caught hold. In the same way the irregular carriers have introduced a new type of second-class passenger service which has proved equally popular. Whether these services will continue to be performed largely by their pioneers is another matter. END

FLYING "Jump!"

Civil Air Patrol

(*Continued from page 27*)

to encourage flying time on squadron aircraft, one wing operations officer checked out only three pilots in eight months' time although more than 50 were eligible and crying for a chance to fly the planes.

At the present time CAP funds are limited to the barest essentials and member pilots of many squadrons are even buying their own gas on official business. However, it is planned to ask the present Congress to provide funds within the Air Force appropriations structure to facilitate distribution, servicing and maintenance of more airplanes and quantities of training equipment of all kinds.

Squadron meetings are held either once or twice a week in the evenings and generally the senior members take turns on weekends flying cadets on orientation flights and other training missions such as aerial photography, air search, parachuting of supplies and navigation.

Right now, state organizations are being organized (some of them very much against their will) on a nationwide basis to function on air search and rescue work under the direction of MATS officers. Heretofore much of the search work and mercy flying has been an individual action, either of a squadron or a wing.

During the war, however, most searching was for military aircraft and was, of course, under the technical command of Air Force agencies. Under the MATS units, all official search missions will be directed from Air Force bases and CAP pilots will be furnished gas.

Big plane exponents tend to underrate the utility of light aircraft for certain kinds of air search work. However, it remains a fact that CAP located one airliner and 14 crashed military planes in a single state (Utah) during the war. The Air Force's score, in multi-engined planes, was zero. Practically every light airplane that has been located from the air after going down in the mountains has been found by the pilot of a small, slow, *Cub*-type plane.

On the L-4 aircraft, CAP is responsible for 1st and 2nd echelon maintenance. Third and 4th echelon maintenance is performed by Air Force personnel at Air Force bases. Civilians who use their own planes on CAP work assume their own costs. Some wing commanders have obtained funds from state legislatures for CAP activities. Others have spent large sums of their own money on CAP. In southern California, two Fairchild 24's and a Beech D-17 have been contributed by interested persons. As might be expected from that indication, the southern California group is an outstanding credit to the nation.

The record of CAP during the war is a real credit, too. In 1942-43, while combat pilots were at a premium, CAP flyers flew 24 million miles on coastal patrol. Twenty-six men and 100 planes were lost in 18 months, but the unpaid pilots spotted 173 Nazi subs, scores of floating mines and hundreds of shipwreck survivors. Thirty-thousand hours were flown along the Rio Grande on border patrol and pilots with the 2nd Air Force averaged 20,000 miles a day on courier service. Forty-thousand hours were flown by CAP pilots towing targets for gunnery practice or radar tracking. More than 24,000 hours were tallied on official search missions. More than 50 men and 150 airplanes were lost on these projects. Exactly 824 CAP flyers received air medals.

Today, one CAP function is to maintain a large, well-trained group of men and women as a reservoir of strength for the Air Force. One of CAP's mobilization missions is to maintain a pool of at least 100,000 cadet trainees trained in ground and pre-flight subjects.

High school students can take a CAP aeronautics course and receive credits in return. They will not be required to join a squadron unless they want to, and they will not be required to take military drill. At the squadron level the aviation subjects will be covered completely, and the cadets will also learn infantry drill, manual of arms, guard duty, military correspondence and similar related subjects.

Each year summer encampments are held at key Air Force bases and the cadets are flown in Air Force transports to and from the encampments. They receive training and practical experience on the latest Air Force equipment, including jet engines.

An important corollary to the school programs are flight scholarship awards that may ultimately reach a nationwide scale. At present in the state of Utah, arrangements are being made to provide free flying lessons to honor students. The award will consist of a private pilot's flight course at a regular flying school. CAP pilots will not undertake flight training, but will conduct the necessary ground school courses. The cadets will be financed by a CAP program and the regular flying schools will receive full payment for the flight training.

Plans call for at least one such scholarship for each ten cadets enlisted.

CAP has been assigned 16 Air Force radio frequencies and provided with surplus equipment to establish a nation-wide radio communications network.

At the present time a large number of pickled PT-13's have been allocated for CAP use but funds are not available to underwrite the cost of unpickling and rendering them flyable. There is an excellent chance, however, of getting them into the air next year.

Obviously, the pool of service trained, ex-combat pilots, is rapidly raising the over-all standards of pilotage in the CAP ranks. Hardly a squadron now exists that cannot raise a crew or two capable of handling a four-engined bomber.

Combat veterans come from all branches—Air Force, Infantry, Artillery, Signal Corps, Navy, Marines and Coast Guard. And while the regulars are still bucking for power at top echelon level, these lower-level volunteers have actually succeeded in some states in establishing a unified Air Force of ordinary civilians. END

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The Atom Bomb

(*Continued from page 22*)

industrial systems (according to British surveys) were as effective, if not more so, than the target system bombing of the AAF. As noted in the United States Strategic Bombing Survey reports, when German industry collapsed, no single target system was responsible, but rather a widespread disintegration of *all* industry occurred.

From this it can be concluded that the most effective air siege will result by concurrently attacking every critical element of an enemy's economy *at the same time.* This will result in a general disintegration of all industry which will, in turn, prevent reconstruction. Oil, transportation, power, vital end products, and weapon factories, if destroyed concurrently, would leave a nation in such a devastated state as to preclude repair, since the capability for repair would have been lost as well. When our bombs were constructed of puny TNT this concept was questionable because we did not have sufficient power and we were forced, therefore, to look for panacea targets, Achilles' heels, and short cuts. Now we have all the power we possibly need. Today the target system can be the overall national economy.

Not to be overlooked are the strategic results of population destruction in urban areas. In a nation of extreme specialization, where each man is likely to know how to perform only one type of work, population bombing may well result in an economic dislocation beyond all expectations. It is likely that not only the economic but the political and social activities of an urban area will grind to a sudden halt after an atomic bombing. Hamburg and Hiroshima are examples to be projected into the future.

If all the critical industrial systems could be destroyed at one blow, so that recuperation were impossible within any foreseeable time, there seems little question but that a nation would die just as surely as a man will die if a bullet pierces his heart and his circulatory system is stopped. Food and fuel would cease flowing. In a matter of days starvation would set in at every urban area. Any attempt to conduct warfare would immediately break down through a complete absence of logistical support. Without homes or fuel, people would perish from exposure. An army in the field with a life of thirty days or less, facing starvation, realizing that the loved ones at home are likewise facing famine, and seeing no prospect for future recovery, is not an army to fear. No army in history has been known to fight with a vacuum at its rear. Such an army will lay down its arms because all cause for hope will be lost.

Can such destruction be achieved by modern Air Power? In the first place, no bombing in the past war resulted in complete physical destruction of industry nor did any target-system bombing cause any one industry to collapse. Still, after a long period of build-up and sustained bombing, major damage to many industries *did* cause a general failure of the whole national economy. Of course, it is illogical to assume that 100 per cent destruction will ever be achieved in the future even with atomic bombs, but it is highly probable that major damage to all the critical industries will kill a nation's economy just as surely. A man or a nation will bleed to death very quickly with many deep wounds. It occurred in World War II, and can most assuredly happen again on a much more vast and sudden scale.

With the atomic bomb conservatively figured at 200 times the destructive power of conventional bombs, 300 B-29s could drop a destructive force equal to that dropped on Germany by all AAF bombers in the past war. Since a force of 300 bombers is small even by World War II standards, it can be employed in one operation. The factors of accuracy, misses, and gross errors are included in this figure. So, *with atomic bombs, Air Power has become 200 times as effective as it was in the past war and it is now able to deliver, in one mission, as much destructive power as it formerly did in approximately two years of sustained operations.*

In other words, one mission of 300 B-29s completes two years of sustained operations by the standards of the past. Two missions by our force of 300 is comparable to four years of the old sustained bombing; three missions, to six years, and so on. It appears that we might have to revise our concept of sustained operations, and with that revision, correct our logistical and tactical planning. How can we conceivably bomb with such a force for more than a month and expect to have any targets remaining?

Next, the question is: Can we penetrate to our targets? In some respects the problem will be more difficult than before. Ranges will be more than double those ranges flown in World War II, and in situations where advance bases cannot be secured, ranges will be quadrupled. More enemy contested air than before must be flown through to reach the targets. We will be up against first-class air power, and to be safe we can only assume that opposition will be at least as effective as that of the *Luftwaffe* at the height of its power. Hence, to plan an atomic bombing operation of the future we must use the combat planning factors of the past war that existed at the time when conditions were most unfavorable for us.

Round trip ranges can be achieved

BANKING BY AIR

NEW YORK CITY banks depend daily on planes for about $80,000,000 in funds. One of the most rapidly developing payloads for air freight and commercial lines is clearance of checks by air.

From New York alone, more than 2,000 pounds of checks are shipped nightly. A similar load leaves San Francisco, Los Angeles and other principal cities.

First begun as an experiment back in 1946, the Federal Reserve Bank found it could clear checks to other Reserve banks fast enough to land more than 200 bum check artists in prison. While the principal reason for undertaking the project was to avoid the backlog of tens of thousands of checks in transit throughout the country, many a paperhanger who fancied himself safe for five or six days when writing a check on a New York bank while he was in California, found himself arrested the next day.

Checks are shipped in crash-proof, fire-resistant containers and none has been lost in transit in more than two years of flying.

with present B-29 and B-50 aircraft operating from advanced bases. There is no doubt that we can reach the targets if we get by the opposition. But fighter escort for penetrating bombers, although highly desirable to reduce the risk factor, is not presently possible. It is conceivable that sustained daylight operations without fighter support might result in prohibitive bomber losses. This would naturally extend the war beyond one month and prolong it until that time when we could gain dominance over defending air. In this event, air siege would revert to air combat.

But the element of tactical surprise, almost certain to exist on the first penetration and possibly for several more operations thereafter, should compensate for this weakness in fighter escort. It can be pointed out that the first few missions flown by small B-17 forces against Germany sustained no losses. Yet, a year later, an unescorted mission to Schweinfurt suffered losses of about 20 per cent and this was deemed prohibitive. It takes time for the defense to adjust itself to the offense, and the air force with the initiative is invariably successful. The Japanese at Pearl Harbor; the Doolittle raid; the first B-29 operation; the Nazi air blitzes of Poland, the Low Countries, Norway, Greece, Crete, and her early attack on Russia, are all examples of the overwhelming advantage of tactical surprise by air power.

To make our force estimate safe, however, we can postulate 20 per cent losses and increase the size of our force to 370, leaving ample bombers to destroy our targets. It is almost unthinkable that we should ever lose as high as 20 per cent on an original operation. The 20 per cent figure for combat and operational attrition was never used in operational planning during the past war. Five per cent was a more realistic figure, and then only when opposition was extremely effective. Moreover, on those few missions where losses of around 20 per cent were sustained, the majority of those missing aircraft succeeded in bombing their targets. Losses were invariably greatest on withdrawal rather than on penetration. Hence, if a 20 per cent combat and operational casualty rate is used, there is every reason to believe that it will not be exceeded and even that most of those not returning will have bombed their targets.

If we assume that the relative combat effectiveness between the offense and defense will be the same in future air war as it was in the past, it must follow that penetration to the targets will be possible. We must answer more questions, however, before we can assume that the bombers' ability to penetrate is as great as ever. Will guided missiles, proximity fuzes, improved electronics, better warning systems, and jet fighters reduce the modern bomber's ability to penetrate? Have improvements in the offensive kept abreast of defensive improvements? Let us take the new developments one at a time and examine them with respect to penetrating and defending air forces.

Jet fighters are operational, whereas jet bombers are only on the edge of becoming so. Does this mean that bombers have slipped in the race for technical improvements? Possibly, but our aim is not technical improvement, as such, but tactical improvement. The ultimate goal is to get the bomb on the target with minimum losses. Does the jet fighter prevent this to a greater extent than did the prop-driven fighter? If penetration is dependent upon fighter escort, the answer is yes. Defending jets will undoubtedly be superior to the long-range propeller fighter and the penetration escort will be defeated. But we have estimated that our penetration will not require an escort provided we achieve tactical surprise. Will the jet, then, be more lethal against the bomber than the old prop fighter? It is doubtful. In fact, it is even likely that the jet will be less effective.

Defending fire from bombers was not effective in the latter stages of the past war, according to the AAF Evaluation Board, *Eighth Air Force Tactical Development*, 1945. A bomber generally survived simply because it was not hit, rather than because it fought off the attacking fighters. Once fighters closed on a bomber it was as good as gone unless, of course, the fighters missed or broke off their attack. The danger to the bomber, then, was measured primarily by whether fighters would intercept. Once an interception was made, the number of bomber losses was almost directly proportional to the time of sustained fighter attack.

Now, realizing this, wherein is the advantage of jet fighters over bombers? Jets have less range and duration than propeller-driven aircraft. The jet will have less chance of making an interception. Even in the past war the vectoring of fighters to intercept strategic bombers was a very inefficient process because well over half of the fighters dispatched ran low on fuel before interception could be achieved. The May 12, 1944, mission of the AAF to Merseburg and Brux is an example. Our losses were great (46 bombers) and the enemy was particularly successful in interception. Still, only 180 enemy fighters intercepted the bombers, although the *Luftwaffe* had over 815 fighters based within effective range of the penetration. Three hundred and fifty enemy fighters were airborne and concentrating near Frankfurt, yet less than 100 of these particular fighters intercepted.

Throughout the air war over Germany, much of the flying done by defending fighters consisted of "stooging" around in the air, forming up, and waiting for the fighter controllers to make up their minds just where to intercept the bombers. The controllers were bound to know the position, course, speed, and altitude of the penetrating bombers, but they had to guess where the bombers were going and whether they would alter course. Too, the controllers had to plan the interception so that a maximum fighter strength could be brought to bear on the bombers. There could be no snap judgment by the controllers, and while they studied the situation, their fighters stooged.

Jets do not stooge very well. Their

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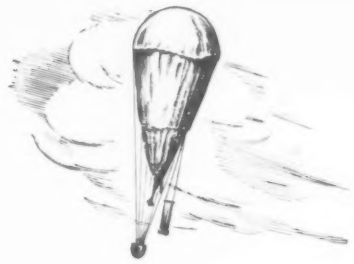
WHO WAS FIRST?



AVIATION history has produced a bevy of "firsts" from the time of the Montgolfier balloons to the days of supersonic speedsters Test your knowledge of aviation history by naming the followin record-breakers from the list of names at the bottom. If you match 50 per cent, you're good; 70 per cent, excellent. Above 70 per cent, you're an aviation expert.

Earhart, Piccard, Wright, Blanchard, Curtiss, Lindbergh, Beachey, Nichols, von Opel, Bleriot, Balbo, Doolittle.

1. **First pilot to fly a balloon in the U. S.**
2. **First to cross the English channel in a plane.**
3. **First pilot to make a trial attempt with flying boats.**
4. **First to loop-the-loop.**
5. **First to fly in a rocket plane.**
6. **First woman airline pilot.**
7. **First to fly in a plane.**
8. **First to fly in a balloon in the stratosphere.**
9. **First woman flyer to cross the Atlantic.**
10. **First non-stop New York-Paris flight.**

ANSWERS: 1—Blanchard; 2—Bleriot; 3—Curtiss; 4—Beachey; 5—von Opel; 6—Nichols; 7—Wright; 8—Piccard; 9—Earhart; 10—Lindbergh.

specific fuel consumption is much greater at slow speeds than at fast speeds. In the future the controllers must of necessity commit the jets to the interception quickly. In doing so, not only will mistakes be made but the jets will be forced to make piecemeal attacks in small formations. There will be insufficient time to form up large forces of jets in order to make concentrated and forceful attacks.

Once an interception is made, the jet will have less chance of hitting the bomber than did the old prop fighter. The speed differential between a bomber and a jet will be so great that the jet guns will not bear as long on the bomber as did the guns of the prop-driven fighter. Finally, the jet will run short of fuel sooner, and will have to break off the attack much earlier. All in all, the jet fighter will not cause as many bomber losses as did the prop fighter. The jet fighter is sure death to the prop fighter because the jet can make or break contact at will. But the jet will have less time to shoot down a bomber than before, and that time factor will save bombers that formerly would have been doomed.

Next let us look at the guided missile problem. We know little of developments in rival nations, but judging from our own development status we have little to fear from this quarter for the next five to 10 years. Ground-to-air missles are not yet operational, and there is no assurance at this time that they will be much more accurate than old-fashioned flak. Air-to-air missiles can be expected to improve some, but since bombers can carry them too, the offensive-defensive race in this respect should remain approximately unchanged.

There can be little question that proximity fuzes will make flak more deadly than before. Estimates have been made that had the Germans used them, our flak losses would have quadrupled. However, it was not often that flak burst directly below or directly over a bomber, and only such rounds would have been fully effective with proximity fuses. Many feel that the official estimate that flak effectiveness will be increased by a factor of four is unduly pessimistic. Furthermore, influence fuzes can be jammed and decoyed by bombers. Certainly their accuracy can be reduced considerably by counter-measures, and perhaps even eliminated. Bombers will fly at greater altitudes, and the enemy will have to build much better artillery than is now in use to be effective at 35,000 feet. It hardly seems likely that flak, no matter how improved, will prevent bomber penetration.

We are leaders in electronic development. And it is doubtful if potential enemies will even develop electronics and the techniques for their use to the stage we reached at the end of the past war.

It looks, then, as if new developments have not given an edge to the defense. In fact, the edge seems to be with the offense in every respect except possibly for proximity fuzes. It can only be concluded that an offensive bomber force, utilizing tactical surprise, *will* be able to penetrate to targets in the enemy heartland. And this force will be able to repeat its operation until the enemy defenses adjust to the offense. By that time atomic bombs will have destroyed all lucrative targets.

If we admit that bombers can penetrate to their targets, and if we admit that they can carry a destructive load on one mission equal to the hundreds of thousands of tons of TNT rained on enemy nations during the past war, why must we hold fast to the old doctrine of "sustained" operations? Suppose our first mission is not successful. We then repeat it. Perhaps we must go back five or six times to achieve enough destruction. Is that "sustained" operations? Indeed it is not. If a war lasts as long as one month, what possible targets will there be left to bomb by conventional TNT bombers? Certainly planners would be hard put to find them. Yet we seem to feel that we must plan for sustained operations with TNT bombs just in case atomic operations fail.

The conception of sustained air operations calls for near total national mobilization of manpower and industry; a huge training program for air crews and supporting personnel; a tremendous and continuous production schedule for aircraft, weapons, and ancillary supplies; a full pipe line in hundreds of ships and trains through vulnerable lines of communications to advance bases; an elaborate sea and ground defensive to secure the lines of communication from enemy attack; and many army divisions running into the hundreds of thousands of troops to secure the air bases.

Life Magazine recently pictorially portrayed this extensive logistical condition as the nominal requirement, and many factions of the Government refer to it as the necessary "balance" between land, sea, and air forces. (See also "The Air Force Moves on Its Feet," page 32, January FLYING.) These misconceptions are based upon and fostered by the Air Force belief that bombing must be conducted month after month, year after year, for an indefinite period, until the enemy is pounded into submission. The build-up to acquire this mammoth military machine takes years.

A modern war will have been long decided by the time the gigantic effort could even get into low gear. Yet we adhere to the outmoded premise of sustained bombing. Even those few who believe in the effectiveness of the atomic blitz would like to hold out for conventional bombing for exploitation. In doing so they vitiate the great advantages possible with a lightning atomic offensive, for by far the largest percentage of our national effort must be devoted to sustained operations to make them even theoretically possible. Our initial striking force is then crippled

as a result of lack of national focus upon it.

The atomic bomb is real. It is operational. It works. There need be no doubt about its combat worthiness. Why then must we revert to the old TNT bombs as a last resort weapon and forever hamstring our logistical and tactical plans with the requirement for sustained operations?

In doing so we are depleting our budget with unnecessary expense, wasting our time, and putting ourselves in the same school of military logic that in the past has been the exclusive province of the critics of air power. Let us not be bogged down by orthodoxy. Let us not always plan the next war in terms of the last, but rather let us look to the future and devise new ways of employing our new decisive weapons.

The traditional concept that wars must always be won by open combat between armed forces has seriously hindered the development of strategic air power and is still holding it back. Yet it is obvious that an air siege which not only blockades an enemy but destroys his reserves, his war potential, and his very means of living will cause his complete capitulation. His forces in the field will rot on the vine without ever firing a shot in open combat. This air siege has tremendous psychological advantages for the attacker because of its lightning speed and overwhelming consequences. Combat between air forces need only be conducted to that point necessary to lay down the atomic destruction. Deception and cover will obviate most of such combat, provided the attack is made quickly and in force.

The targets should be the most vital enemy urban areas. Here all major industry is located and through these areas pulse the national life-blood in communications arteries. The destruction of target systems might seem to be a cheap and humane way to win, but experience proves otherwise and we dare not take that poor chance. There is far too much at stake.

Once the atomic air siege is initiated, there is little more to do from a military standpoint. Post-war aims, occupational or otherwise, must be carried out, but these most certainly need not include bombing operations patterned after World War II. If more bombing is required to enforce our will, let it be atomic bombing. There seems no reason for clinging grimly to the outmoded sustained bombing concept which shackles our current military thinking.

Once freed from this mental shackle we can concentrate our full energies on the concept of a super air blitz which will force an unqualified decision within a month at the very outside. The tremendous production, supply, transportation, and base defense requirements formerly necessary for sustained operations will be eliminated. Such a concept will give us the greatest chance of success and require but small drain on our national resources. A ready fighting team, a true atomic bombing-force-in-being, can win the game without ever making a substitution. END

I Learned About . . .

(*Continued from page 46*)

canyon, breaking another cardinal rule of mountain flying—never enter a canyon of which you are uncertain.

It was evident a few minutes later that not only were we in a canyon and "boxed in," but that the town was not Glenwood Springs, it was Aspen, and there was no airstrip. I was just about to give up then, but my confidence was momentarily restored by Doc saying, "Don't get yourself trapped, bub." I'm sure he had seen by now we had but one chance in a million of turning back in this canyon. One look ahead convinced me there was no chance of climbing out. Without a second's hesitation I hugged the eastern wall of the canyon.

Later, I recalled that my years of soaring knowledge had undoubtedly saved our lives. I had no time to think. Seconds were going by, and the end of the canyon loomed closer and closer. Finally I thought I had enough altitude to attempt a "Split-S." Over and down we went, narrowly missing the floor of the canyon. With a gasp of relief, we were again in the clear. But our problems weren't over.

I had now made up my mind that there was but one thing left to do. After reaching what I felt to be a safe altitude, I called Doc on the inter-com and told him to loosen his belt, open his hatch, and prepare to hit the silk. I then trimmed the ship, and was gathering nerve to become a member of the caterpillar club when suddenly Doc called over the intercom: "Hey Art! I think we're on right tank. The gauge seems to be going down a little." Brother, if it were only true. But was it? There was only one way to be sure—to circle over the town long enough to find out. We did this for about 15 minutes, each one seeming longer than the preceding. We finally came to the conclusion that the right tank was going down. We picked a new heading for Denver.

Hardly had we crossed the first ridge when it dawned on us that we were not yet out of the predicament. Our right tank was going down all right, but so was the left. In stripping the gears of the valve we must have turned it on half right and half left. As soon as the left tank ran completely dry, the valve being only partially open to the right tank, the old *Wasp Jr.* would conk for sure. Naturally we couldn't risk crossing any ridges, so we followed a valley that ran in the general direction of south, hopelessly lost, and just waiting for a miss of the engine before we were to bail out. It seemed inevitable, and the thoughts of jumping in weather 25° below zero did not appeal to us in the least. We are both skiers, and familiar with snow, and we knew our chances of hiking out in five feet of powder snow were hopeless. And how far to hike to find refuge? The magnitude of this wilderness empire was starting to impress us.

We had just about given up hope of finding a suitable landing spot when we sighted a town about 20 miles away. It was too much to ask that they should have a cleared runway, but as we came nearer we saw one. At first we couldn't believe it. Then another fear struck me. What if the engine would quit after we got too low to jump? I urged Doc to jump and be safe, but he was still allergic to the silk, so we started letting down. My hands were damp with perspiration on the stick. I had to go through the cockpit procedure twice to be sure everything was right. Having very little time in this particular plane, I wasn't at all interested in setting her down dead stick. But I soon learned I could, for she quit cold right over the strip. We made it, and I learned about flying from that. END

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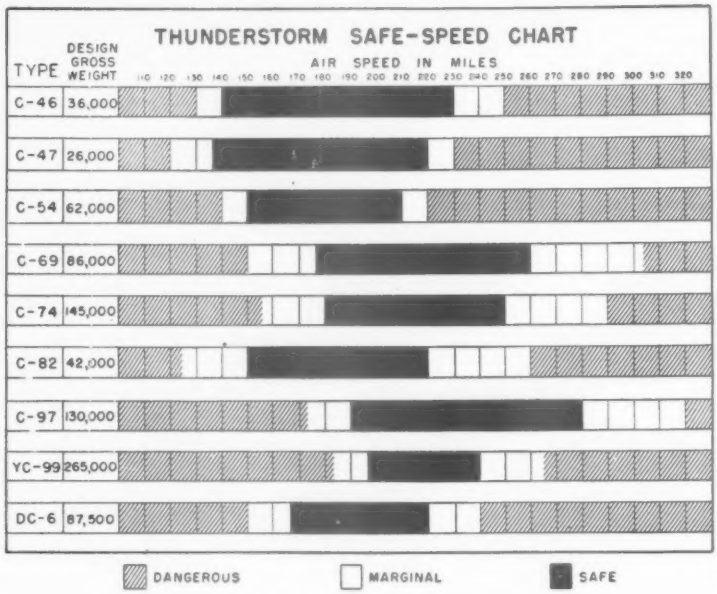

SAFE THUNDERSTORM SPEEDS

IT'S dangerous to fly too slow or too fast through thunderstorms. The safe speed chart (above) was prepared by the Air Force's All-Weather Flying Center, Wilmington, Ohio, to show the airspeed limits within which nine types of transport planes can be operated safely in thunderstorms. Below the safe minimum speed indicated, the plane will be moving so slow as to approach stalling speed. Above safe maximum speed, increased stress on the plane might result in structural failure. The chart is good for both average and "heavy" thunderstorms. The heavy thunderstorms include vertical gust velocities of as high as 31 to 43 feet per second. The latter would be experienced on the average of only one time for each 50,000 flying miles.

Case for the Air Navy

(*Continued from page 17*)

dispersed at sea, the best it could do would be to sink or make unworkable a single vessel, perhaps one out of four of the carriers. At its worst such a costly attack would probably not get home at all through the force's impenetrable umbrella, improved from day to day since the *Kamikaze*. Perhaps, ultimately, the carrier task force will muster atomic anti-aircraft missiles for use in its own defense.

Many who witnessed the Bikini results (including my distinguished colleague, William Laurence of the New York *Times*) disagree with this estimate. But, Navy operators say, the whole initial explosive effect at Bikini would lie well within the mile-wide carrier circle at sea. With luck, such an attack could reach but one ship. The secondary effect, the radioactive cloud of mist and water, moves downwind and only at the speed of wind. Any vessel in a carrier task force can move at 30 knots or more and has the speed to maneuver out of its lethal path.

Thus, the Navy is doing anything but "fighting the next war with the weapons of the last."

Openly, no military officer can mention the word "Russia." But they are not blind, however officially dumb they must be. Russia is the lone possible enemy against which all plans must be made.

As the situation stands now, any time Russia chooses to move she can be at the Atlantic and Channel coasts in two weeks. In six weeks she can have Spain and Italy. In two months, with luck, she can have much of North Africa and the Near and Middle East.

With all that in Russian hands, it is extremely likely that the British Isles will be at least neutralized to the extent that they will be unavailable to our long-range, land-based aircraft.

And it is here that, willy-nilly, the many planners cast a dubious eye at long-range strategic bombing by land-based aircraft. Alaska and Iceland, on their maps, are the nearest land on which such craft could be based. And to carry their loads, even atomic bombs of inconceivable destruction, to the heart of the Russian land mass, they must fly on predetermined paths over as much as 1,000 miles of enemy and enemy-controlled territory. Along those paths would lie swarming screens of Russian interceptor fighters, of which they have many, probably of excellent quality—including jets of high performance.

For those hundreds of miles, into and out from the targets they must reach, the bombers must fly without fighter escorts unless (in certain fortunate contingencies) it be carrier-based fighter escort. For today, and for the tomorrows in which such a conflict must be considered, no land-based fighter, particularly no jet, can go all the way in and all the way out with the bombers.

It shocks this writer to hear such a great soldier as Gen. George Kenney, now head of the Air University, speak of the B-36 as "needing no fighter escort." True, the B-36 is so different from the B-29 in size and accomplishment as to be in a different category. But so are modern jet interceptors in a category different from the Jap *Zero* and the *Messerschmitt* Me-109, not to mention the German jets (few as they were) that played havoc with our bomber boxes toward the end.

It seems against the known facts—those at Schweinfurt, for instance—to assume that a B-36, or any other plane with a bomb load and the fuel capacity for long range, can be immune from fighter attack today, even at 40,000 feet and a speed over target of 365 m.p.h. The fighter carries no such load penalties against performance. Nowadays it has a unique advantage in the new rockets which by their very nature cannot be used as defensive weapons by bombers. They can be fired only in line of flight of the plane which discharges them. Fired otherwise, as broadside from a bomber, they weathercock into the line of flight and away from the attacking fighter target.

In view of all these factors, the distrust of long-range strategic bombing value in a possible war is more understandable. The British Admiral Sir Gerald Dickens (grandson of the novelist), a distinguished planner and commander in the last war and a military scholar, questions strategic bombing both in theory and on results. Similar doubt is reported expressed by the RAF highest command in a "reconsideration" probably available to our own Air Force.

Admiral Dickens' little book, still available only in the British edition, says the entire theory of early strategic bombing in the last war violated the principles of war. It diverted Britain's slim air potential (for the first time he admits the woeful inadequacy of British Naval air) to targets of remote value. Meanwhile, immediate targets—the U-boats in the Atlantic—came twice very close to winning the war for Germany. The mistake cost the lives of 30,000 British seamen besides almost giving the Germans control of the seas on which the battle's lifeline later depended.

Perhaps both his and the new RAF view of strategic bombing neglect its cumulative effect. That was ineluctably testified to by Goering who said that when he saw fighters with the bombers over Berlin he knew the air war was lost. But Admiral Dickens points out that the

Wehrmacht fought on with Berlin in rubble. He says that despite the ruin of the Ruhr and the Baltic ports and other complexes through six years of *carte blanche* to the bombers, the Germans turned out jets, V-bombs, improved U-boats and better tanks than ours. The application of his thinking to any future war seems inescapable.

"They bombed factories in 1940," he writes, "when the German armies were streaming over Europe. Instead of attacking the tanks, guns and transports in use against us, they attacked munitions in the making."

Would the same reliance be placed on bombing obscure complexes in the Urals when the Russian armies are establishing bases on the North Sea and the Bay of Biscay for the *schnorkel* submarines they learned to build—and have built—on German plans? Such *schnorkels* actually have been reported, though without confirmation, off Hawaii and off the "unreachable" state of Texas in the Gulf of Mexico.

Admiral Dickens, some of our own Navy opinion and that attributed to the RAF all grant the value of big bombers when they attacked the fuel that fed the *Wehrmacht* in the end, and when they, with the livelier fighter-bomber, struck at bridges and roads and railroads that isolated the Normandy and other battlefields.

The Navy has no panacea for the *schnorkel* submarine except that perfection of tactics which made the fast carrier task force immune to Jap submarine attacks in the Pacific, plus such newer defenses as antisubmarine submarines, sonar devices and other secret developments. They believe they are on the long end of that calculated risk. And, they ask, what better means than the fast carrier task force have we for combating the dread effectiveness of the long-range *schnorkel*?

Some experts foresee a war in which, as usual failing to strike the first blow, the democracies are knocked back on their heels, forced to a holding action as they prepare, and then go on to gain the victory by adherence to the principles of war.

By the terms of that problem the scene of such a holding action will be at sea—the Atlantic *plus* the Pacific if events go as they seem to be going in China. Sea-air, the fast carrier task force (and Admiral Dickens points out that sea-air, the coordinated force that Nimitz had, is far different from sea *plus* air) is the only force available that can hold at sea and spearpoint and protect the swing from the defensive to the offensive with amphibious landings both in Europe and Asia.

Such beachheads being established, the long-range bomber comes into play. Whether starting from Iceland or Alaska, or from a newly-won Normandy, it can fly with fighter escort to its target in the Russian homeland mass.

The fast carrier task force has proved itself. Its big past experience was in the tropics. But already enough has been learned from "Operations Frostbite" around those transpolar routes by which the atom bomb is counted on to pass, either way, to warrant the opinion that pilots and gunners, housed, fed and warmed aboard their own big ships, are more efficient than those compelled to suffer the vagaries of weather on an Arctic land base or ice floe.

The self-sufficiency of the floating base, the carrier task force, is little understood. In the Pacific they kept at sea for months. Huge trains of tankers and cargo ships met them at secret rendezvous, supplying them with everything from fuel and ammunition to ice cream, fresh meat and cigarettes.

There has been nothing in the history of war like its mobility. It can strike the enemy at one point with a 1,000-plane blow today, disappear and strike another blow 24 hours later, 1,000 miles away. Compared to it, land-based airpower is—tied to the ground. Land bases are forever known to the enemy, as are the paths their planes must fly. Compared to the immunity of the carrier task force to atomic attack, a single atomic bomb that might get through to a 1,000-plane land base would make it immediately and interminably unusable. There is always the possibility that our land bases may fall to the enemy—as the Japs' fell to us. No carrier has ever been captured and used against its first possessor, and it seems highly unlikely that any carrier ever will meet such a fate.

All the services are aware that the national economy itself, rather than specific Congressional appropriations, may limit what they can do to be prepared.

Reference is made to Gen. Omar Bradley's statement that a 1,000-plane overseas airbase would require 250,000 Army troops and 125,000 Air Force troops to defend, requiring 25,000 tons of supplies daily. This is far more than the first cost of a fast carrier force and its cost of operation.

The argument on carrier economy is strong. The carrier task forces, at least four of them, are built, paid for, and, save for planing and manning, ready for use. Beside the cost of such land bases, the $25,000,000 apiece which is now being spent in giving the *Essex*-class carriers armored decks and other defenses which the Pacific showed they needed, is small indeed. So is the $124,000,000 to go into the cost (over five years) of the 65,000-ton carrier which some in the Air Force so deplore.

But perhaps the most forceful argument on the side of economy is that of the weight of aircraft needed to carry a given weight of bombs. A long-range, land-based plane must weigh about 300,000 pounds in order to deliver 10 tons of bombs in enemy territory. A carrier-based weight of 60,000 pounds of aircraft can deliver the same tonnage of destruction. The rest of the needed weight for range is borne in the carrier hull, transported four-fifths of the way on the surface instead of in the air.

Why cannot carrier and land-based air be operated as one? There is a horrible example. England brought about "unification" long before World War II. All airplanes were designed and procured by a single ministry and all pilots were trained by the RAF.

Admiral Dickens has written of the woeful inadequacy of the British Naval air arm and of the failure of the Coastal Air Command against the submarines. None of their planes had been basically designed for carrier service—and planes must be so designed from the arresting-hook up—and none of their pilots were basically trained for operations at sea. So, when British carriers finally joined Task Force 58 under Admiral Halsey for the final assault on Japan, every aircraft on their decks was designed and built in the United States. While our carriers were getting off six strikes a day, the British were getting off two.

Today the Royal Navy designs its own planes and trains its own pilots. The result of that was magnificently demonstrated by the group of Royal Navy pilots who thrilled the crowds at the Idlewild air show last summer.

The Navy, with solid backing, believes it has a unique weapon and one of irreplaceable value in the one- or two-ocean war that must be fought with Russia if we come to grips with her. END

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Good Will Flight

(*Continued from page 39*)

the war and has been at it ever since.

Oregon's flying businessmen came back from their tours with more than souvenirs and picture post cards in their pockets. They came back with orders worth thousands of dollars—and with ideas for business expansion and investment possibilities.

Alaskans were particularly responsive to the aerial approach. Salesmen crowd the steamship and rail belt during the summer season competing for orders. But few reach the real Alaska, far from the steamer lanes where the goods are consumed and the orders originated. That's where Oregon's aerial executives landed —and found themselves taking orders in spite of themselves.

Their tour was planned partly to advertise and promote a new direct steamship service which makes Portland a seaport of entry to Alaska. Two air cargo carriers at that time made Portland an airport of entry. The tour, like others before it, was co-sponsored by the air-minded Portland Chamber of Commerce. The Oregonians did not come with order book in hand. But they found businessmen like Archie Ferguson, "the world's craziest flyer," at Kotzebue handing them orders for a whole shipload of supplies. Owners of remote mines wanted to buy carloads of goods.

Even in the cities the aerial approach worked wonders. This was the first such air tour Alaska had ever seen, the first time solid businessmen who owned and operated their own enterprises, had dropped in on them by air.

"Why these guys are flying their own pop wagons," said one astonished Fairbanks merchant. "They speak our language."

A Portland banker calling on one of the bigger banks in the Territory met a bored reception.

"Three Seattle bankers have already been in this week," the president informed the Outsider.

Then the Oregon flying businessman happened to mention that he was flying his own plane. The Alaskan thawed out like an icicle in an oven and took him around to introduce him to "the fellows." Here was the first genuine flying businessman he had met from Outside. And he got the business.

While most of Oregon's pilot-businessmen have learned to fly since the war some of them put their wings to work years ago. Ed Parsons, Astoria radio engineer, learned to fly at the late Tex Rankin's school in Portland 20 years ago, bought a Taylorcraft when they came on the market and began landing in cow pastures along the hilly coast of Oregon and Washington to install and service refrigeration machinery. He had two crack-ups the first year that cost $1,000, yet he repaid the $1,100 price of the plane and all maintenance and repairs by charging his clients just five cents a road mile.

Parsons now flies an *Ercoupe*, chosen for its economy of operation, and still figures that he can fly for half the cost of driving—at least along the mountainous west side of the states of Oregon and Washington.

Parsons now owns radio station KAST in Astoria and operates a radio wholesale store and a specialized radio repair service for commercial fishermen the length of the coast.

day I got a call from Eureka, Calif., about

"I couldn't do business without a plane," Parsons explained. "Like yester-300 miles down the coast. A big fishing boat was laid up. Trouble with its radio and depth-finding equipment. Every day's delay cost those boys $2,500 to $3,000, with tuna at $630 a ton. I got there in less than three hours, repaired the equipment and was home for dinner."

That's typical. Parsons takes longer trips once or twice a year—to Chicago every winter to buy radio supplies, traveling via Canada because he finds the weather better. He flies virtually every day, estimates he has flown "somewhere between 6,000 and 10,000 hours, as high as 2,000 hours in one year." He has "more than 5,000 hours logged."

Lawyer Kern Crandall crammed a 200-pound passenger, parachutes and an impossible quantity of baggage into his *Supercruiser* for the Mexican tour and still stayed up with the leaders. He figures his plane saves his clients thousands of dollars a year.

"It's got to the point where they now *ask* me to use my plane to handle their business. They know what it costs when I have to travel by train or car. A professional man's time is worth too much to waste that way.

"The other day I had a case to try in Burns, 333 miles from Portland by car. That's 10 hours of hard driving by car; 12 hours by bus; a full day by train or more, depending upon connections. It took me just 2 hrs. 45 min. in the *Supercruiser*.

"What's more, I can rest while I'm flying. Driving, fighting traffic on crooked, slippery mountain roads, wears me out so I'm no good when I get there."

Crandall figures he flies about 200 hours a year strictly on business. He has logged more than 1,000 hours.

Mr. and Mrs. John Teufel, who caught the biggest fish on the Mexican tour, a 50-pound grouper, raise roses with their *Seabee*. They keep the plane on the ramp at the back door of their rambling farmhouse near Hillsboro, Ore., between the house and the greenhouse, alongside the truck, the tractor and the station wagon.

Comes a call from Montana for a shipment of roses fresh out of the beds. Teufel loads them into the ample bosom of the *Seabee* and 15 minutes later he is transferring them to an airliner at the municipal airport. Six hours later they are delivered to the customer, with the dew still wet on the buds.

Such service wouldn't be possible in 30 hours by any other means. That's why Johnny gets the orders.

"I figure the plane pays its own way. It's as valuable in its way as my station wagon," says Teufel.

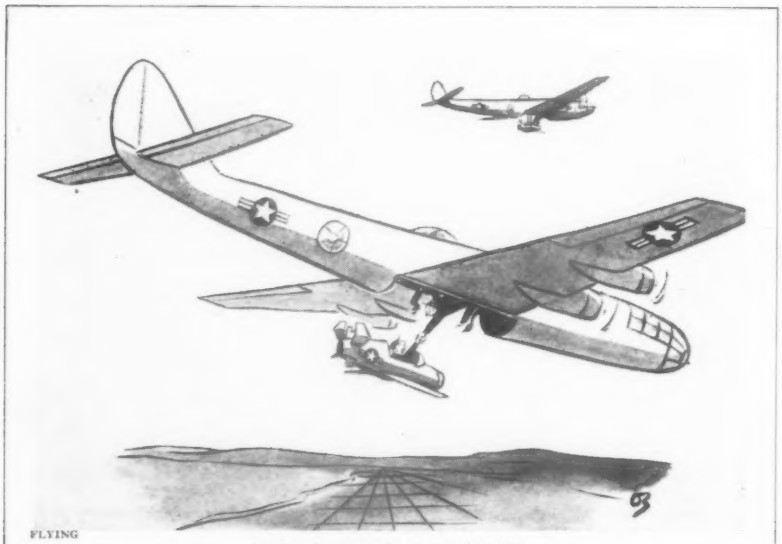
The Teufels are a shining example of the "airmancipation" of the American farmer. Not only does John use his plane to deliver roses fresh within a radius of 300 miles of his farm and for business and sales trips, but he uses it to free his family from the isolation of the farm.

One day this summer he took the kids to the beach in the afternoon, returning in time for chores. Next day he flew the family to Waldo Lake, 5,410 feet up in the Cascades where fish pick your pockets to get at the bait.

Last fall the Teufels took off Saturday morning for a more extended outing. Three hours later they were landing on a Canadian lake untouched by road or trail. There they caught the limit of fish, shot three bucks and a cougar and were home again early Monday morning.

They would part with their truck or their tractor before their *Seabee*.

The planes which help Oregon's businessmen to earn a living also enable them to do more living. END



"What happened to your hook?"

Butane-Powered Cessna

(*Continued from page 42*)

exhaust will give all heat needed in the heat exchanger.

Hughes enumerates many advantages of butane over ordinary gasoline. First, it eliminates wear and tear on the engine. Butane is a slow firing fuel, giving a pressure push to the piston instead of the bang of a sudden explosion. Butane has an octane rating of 100 and mixed with gases of the same group, such as propane, the rating can be boosted to 125.

No carbon is formed by butane. Thus no crankcase sludge is formed. Butane will not mix with oil, thus making it possible to use lighter oils in the engine and to keep the oil at an even temperature.

Use of butane, Hughes says, eliminates the danger of carburetor ice since the fuel is already pre-heated and vaporized when it goes into the carburetor.

Liquid butane weighs only 4½ pounds per gallon where gasoline weighs 6½ pounds. Butane costs only nine cents a gallon where 80 octane gasoline is now selling in the neighborhood of 32 cents.

Subsequent test flights showed that on a 38-minute flight covering 71 miles, 3.9 gallons of butane were consumed by the Cessna 140. Using gasoline for the same length flight, covering the same distance, 3.6 gallons were used.

Hughes started his experiments more than a year ago and has operated all types of engines on butane, from 1,400-h.p. Allisons to automobile engines.

His personal automobile is equipped with one of the systems. He can, by turning a control, change from regular gas to butane and back again. When he switches from gas to butane, the new gas takes hold immediately. When switching back to gas, sufficient time has to be allowed for the fuel pump to draw the gas from the tank before it takes hold.

There is an "off" position on the switch to take care of the lag, comparable to the lag of switching from one tank to the other on any airplane fuel system. END

Stratosphere

(*Continued from page 32*)

the planes might melt into molten metal. Even if they didn't, the heat would seriously weaken the plane's structure. Other scientists disagree emphatically. They claim that the air molecules are so far apart that even if they were hot, the planes would radiate the heat faster than they could absorb it.

Above the stratosphere, the next major division of the atmosphere is the ionosphere. It begins around 50 to 60 miles high and contains radioactive particles, and free ions and electrons. The ionosphere is a kind of radio mirror which reflects back to earth all but extremely short radio waves. This reflection makes long distance radio reception possible. Without it, radio reception would be restricted to line-of-sight distances.

There remains the very good possibility that man cannot survive in the ionosphere—even in a comfortable pressurized cabin. Radiation received from the sun and possibly other sources might be deadly. We are apt to overlook the part that the atmosphere plays in filtering out harmful radiation before it can strike us. Yet the blanket of atmosphere over each one of us weighs as much as a shield of steel four feet thick—and is probably a much better filter.

One of the most effective filtering components of the atmosphere is ozone. Ozone is a form of oxygen in which the molecules contain three atoms of oxygen instead of two. Ozone absorbs most of the ultra violet light reaching the upper atmosphere. The earth's ozone mostly exists in minute amounts between 10 and 40 miles high. Above that thin protecting shield, pilots would be exposed to nearly the full radiation of the sun. Unless it can be reflected away from them somehow, it would be lethal.

The ionosphere is buzzing with radioactivity. The atoms have become "ionized" and the atmosphere has become electrically conducting. There are atoms charged with energy. There is also a constant rain of cosmic rays from interstellar space. Cosmic rays are ultra high speed particles possessing energy in excess of billions of electron volts, some of which are capable of producing atomic fission. There are secondary and tertiary products of cosmic rays, usually centered in the area between 20 and 80 miles high. What would happen to man exposed to this radiation? We do not know the answer.

There are still other hazards in the high atmosphere. One is a rain of charged particles from the sun, which vary depending mostly on sun spot activity. Heavy sun spot activity means a heavy rain of such particles one or two days later. They collide with the atoms of the air, making them glow. They are deflected toward the poles, and when they collide with these atoms of air, making them glow, they are believed to cause the northern and southern lights, which have been observed as high as 600 miles. This is our main evidence that the atmosphere does extend that high If so it must be almost unimaginably thin, since half the atmosphere by weight is under 18,000 feet, and 14/15 of it is under 60,000 feet. At 80 miles, for instance, air pressure is something like 1/10000000 pounds per square inch.

Meteoroids from space are also entering the upper atmosphere in large numbers. Most of them are burned up before they reach the earth's surface. They would be a definite hazard to extremely fast aircraft at high altitudes.

All these matters and others are being investigated in the Air Force Upper Atmosphere Research Program. Take the matter of sky brightness, for instance. Because of lack of reflecting dust and the thin atmosphere, the stars are visible even in sunlight. Any object, such as enemy planes, would be almost impossible to detect by sight. It is believed that the sun

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appears as a brilliant disk in a dark sky. Special photoelectric cells so sensitive they can measure the starlight at high noon are recording their readings. The magnetic field of the earth, about which we know comparatively little, is also being measured.

Radio transmission at high altitude is expected to be difficult because of the large amount of ionization and radioactivity. Propagation of radio waves is being measured carefully in the V-2 tests. Another great difficulty is the breakdown of electrical equipment at high altitude. Electrical lines arc over, affecting not only radio reception but even the electrical pipe lines to the engines. Developing an insulation that will channel high voltage electricity and prevent arc-over is one of the greatest problems and first essentials of upper atmospheric operation.

All these problems are most formidable. Yet they must be solved before we can operate piloted planes in the high atmosphere. We are only beginning to realize what the difficulties are, let alone to approach a solution. Long-range guided missiles, of course, are an easier problem. They can be pre-set to carry the warhead into a general area, and the final guidance, or homing mechanism, can take command under normal atmospheric conditions.

Development of a piloted force to intercept such missiles is the main difficulty. From what we know, however, it is possible to visualize what such an airplane would have to be.

Though far different from anything we have today, it would still need wings to give it lift in the lower atmosphere and permit it to land. Perhaps some device would be available to retract them, or to change their sweep-back. The plane bearing those wings would have to be pressurized, shielded against radiation, almost certainly propelled by rocket power. Its guns would be automatic firing aimed by radar. It would have unusual radio and electrical equipment to overcome ionization and prevent arc-over. It would probably require provisions for refrigerating cockpit, fuselage and wings at some speeds and altitudes, and heating them at others. It would need the most sensitive temperature and pressure controls. If such a plane were a fighter, even for half-hour flights, it would be big. It would need at least a three-man crew—pilot, gunner-co-pilot, and a navigator-engineer.

All this is more difficult than might seem off-hand. The generals and admirals who talk blithely about all-out war in the stratosphere are talking about something a good many years off. Today we can build rocket planes which operate at altitude for a few minutes. With improved fuels and motors, with air launching, and with careful operation, it is possible that in five to 10 years we will have aircraft capable of operating at high altitude for a half hour or so. Such planes would not be capable of long-range attack, but would be excellent for defense against long-range guided missiles. At present, operation in the stratosphere, except for a very few experimental planes, is restricted to the one-way trips of rocket-propelled robots. END

Betty Skelton

(*Continued from page* 36)

Dave had their licenses. Betty was only 12 and would have to wait four more years, but meanwhile she piled up hundreds of hours of dual with her father and mother. Dave really got the flying bug. He had been a railroad conductor for 17 years. He quit his job to become a flying instructor.

A couple of years later he moved to Tampa and started his own flying school, Airco Aviation Corporation. Meanwhile, Betty continued flying. She had her commercial license when she was still in high school. She got a job with Eastern Airlines as passenger service representative, and worked nights so she could fly days. By the time she was 18 she had an instructor's rating. She also started flying air shows.

NAA was sponsoring an air show in Tampa, and someone suggested it would be a good idea to have a local girl take part. Clem Whittenbeck, international aerobatics champ for several years, taught Betty aerobatics in two weeks in a PT-19.

"I did one loop, a Cuban Eight, and some slow rolls," she recalls. "I flew so high I wonder that anyone saw me." But people did see her and they liked her. Harvey Thornton asked her to appear in an air show at Lake Wales. Other show sponsors heard about the petite little flyer from Tampa. In 1946 Steadham Acker asked her to come to Reading, Pa., to appear in a show he was sponsoring. Betty was in. She flew about 15 shows that year, 30 in 1947, and about 45 in 1948. What pleases her most is that they ask her to come back.

Betty's air show season usually starts in April, and runs through September. She flies 2,000 miles on average weekends to appear in shows, and has what she thinks is the best job in the world. She's really enthusiastic about it.

"People just can't do enough for me," she says. "I meet a wonderful gang wherever I go, and I just like meeting everybody and being one of them. I've never had anyone anywhere say anything out of the way to me."

Her first advice to women pilots is "be a lady." She doesn't see any point to slopping about an airport in overalls. Her standard flying luggage always includes an evening dress, a hat, and some nifty slack suits. She used to carry canned Florida orange juice, a portable radio, and even a portable ironing board. But her present plane is too small for anything but a strictly small fry luggage case.

Betty is now flying a Pitt Special, built by Curtis Pitt at Gainesville, Fla. It is the only one of its kind so far, though a number of other aerobatic pilots are thinking of ordering similar planes. It weighs 568 pounds empty, has a 16 ft. 9 in wing span, and is powered by a 90-h.p. Continental engine with fuel injection. Betty's plane is painted bright red with a white sunburst on top, and its Aeromatic prop cruises it at 135 m.p.h. Betty has just christened it "Little Stinker, Too," but sentimentally it can never take the place of the first Little Stinker—the cut-down Great Lakes biplane with which Betty won her first international championship. The plane got its name because the mechs who were converting it wouldn't cuss in Betty's presence. Whenever she was around they'd just call it "the . . . little stinker." Several months later she had a skunk painted on it, and now everywhere she goes, people give her carved and painted skunks. Betty has more than 60 imitation skunks and one real one—properly descented, of course.

In all her years, Betty has had only one accident—in an automobile. It nearly cost her the chance to win the 1948 All America Air Maneuvers and be international champion. The driver of her car slammed into a telephone pole. Betty spent two weeks in a hospital and another month in bed.

Then, in defiance of her doctor, she dragged herself out of bed for two hours a day to practice her flying technique. She had only 10 days to prepare for the contest. When her doctor found out that she'd not only sneaked out of bed but had been flying, he quit her.

Betty flies her air shows wearing a quick-fitting back pack parachute. She has no stirrups on her rudder pedals, and uses two seat belts to hold her in. She is careful to wrap a thick Turkish towel around her middle because the tossing around she takes in her plane beats her black and blue. She does not use a shoulder harness but has considered installing one in her plane.

When Betty flew a show at Chicagoland Airport last fall, she had just finished flying aerobatics at the National Air Races at Cleveland, along with such other famous flyers as Bevo Howard. She arrived in her room at the Ambassador East Hotel to receive the bad news that the pilot flying Little Stinker I back to Florida from Cleveland had crashed and washed it out. Her first comment was, "My, I'm glad he wasn't hurt."

Betty gets up early in the morning when she is flying air shows because she has to be out on the field in time for pilots' meetings, and then must check her plane carefully. She usually has two exhibitions each day of the show. A typical sequence includes a slow roll on take-off, a four-leaf clover (usually with colored smoke), hesitation Cuban eights, eight-point hesitation rolls, eight rolls completing a 360° turn, and a 360° inverted turn. She also does such "minor" jobs as double and triple snap rolls, wing tip pick-ups, and outside loops.

"I'm not doing stunt flying," Betty hastens to explain. "I'm just trying to do precision flying. Every good pilot is required to do aerobatics. But he does it at altitude. All I am trying to do is to bring the aerobatics down where people can see them. It's precision work, that's all.

"I'm planning every second. Everything I do is carefully figured out in advance. My aim is solely to give people a better understanding of flying."

She is careful to make nothing of her flying skill. "I fly because I like to. Put

it down as an occupation . . . it's just what I happen to be doing."

Nevertheless, Betty does have one ambition. She wants to set a new woman's speed record. Jacquelin Cochrane has the present record of 412 m.p.h. Last summer Betty borrowed Woody Edmondson's P-51 racer and the whole town of Tampa and the County of Hillsborough declared a Betty Skelton Day and turned out to watch her set the new record. She was averaging 421.9 m.p.h. on her test runs when the engine blew up on her second pass.

Betty looked down at the blue waters of Tampa Bay and debated whether to jump. Edmondson, on the ground, almost had heart failure. The tower broke in and advised her to hit the silk. The only possible landing place, McDill Field, looked a long way away. She nosed the plane toward McDill and made a perfect dead stick landing.

"I had six hours in that plane," she later said ruefully. "Five hours and 57 minutes with the engine on and three minutes with it off."

"Why didn't you jump?" she was asked.

"Jump? I couldn't jump in the bay," she said. "Heck, I can't swim." END

Mardi Gras

(*Continued from page* 35)

can be seen in the old French Quarter, once the elite section of New Orleans.

(4) In this section, the pirate Jean Lafitte and his brother operated a blacksmith shop at 900 Bourbon Street until 1800 as a blind for their smuggling activities.

(5) The "Napoleon House" at 502-514 Chartres Street was built by a wealthy merchant who planned to rescue Napoleon and bring him to New Orleans. The house still stands as a monument to a plan that was ended by "The Little Corporal's" death at St. Helena.

Three airports are near New Orleans:

NEW ORLEANS AIRPORT. Six and a half miles northeast of the city, New Orleans airport caters exclusively to private pilots. Plugged as the "finest and only perfect airport in the world," the field is managed by John Matassa, who promises that Mardi Gras pilot-visitors will be "assisted in all ways possible." The airport's modern administration building has overnight accommodations (from $2.50 to $8) but is probably reserved to capacity for the Mardi Gras. It has four asphalt runways, the longest 4,000 feet. Tiedown is 50 cents to $1.50 per night.

A restaurant on the field serves hot meals and snacks, and the port has a CAA-approved repair shop, 80-, 91- and 100-octane gasoline. Transportation into New Orleans by cab is approximately $1.75. The field has seaplane facilities. (Only approach obstruction is a 30-foot power line running parallel to the south side of the field.) New Orleans airport phone number is FR-3161.

ALVIN CALLENDER AIRPORT. Across the Mississippi (by ferryboat) Alvin Callender Airport is nine miles southeast of the city. It has three runways, the longest 5,000 feet; and has minor repair facilities during the daytime. Tiedown fee is $1 per night, and 80- and 90-octane gas are available. Runway lights will be turned on by request. A lighted 700-foot tower is located five miles northwest of the field. Transportation to town costs approximately $5.

Assistant Manager R. C. Kent, says he will "help pilots obtain reservations and transportation to town."

Incidentally, Kent suggests that pilots might like to fly to Grand Isle, 50 miles south of New Orleans in the Gulf of Mexico, which has "one of the finest beaches in the country and is a grand fishing spot. Boats can be chartered for fishing, and planes up to the size of *Bonanzas* and *Navions* can land at Grand Isle."

Callender Airport phone number is Algiers 3176.

MOISANT INTERNATIONAL AIRPORT. Twelve miles northwest of the city, Moisant is a commercial field and hangar space is not available for private planes. The manager recommends that pilots land either at New Orleans or Alvin Callender airports. Moisant has four concrete runways (longest 7,000 feet). All types of service (90- and 100-octane gas) and repair are available. A restaurant on the field serves hot meals and snacks. Limousine to the city costs approximately $1.15. Airport phone is Kenner 6611.

New Orleans is shown on the New Orleans (O-6) sectional chart. END

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CLASSIFIED SECTION.

The Mail Box

(*Continued from page 6*)

Y'R HONOR

. . . My sole purpose in writing you is to defend all the A&E's and instructors and fixed-base operators who are so muchly maligned and criticized . . .

I sell furniture for a living and have a job which covers the entire United States. My log book looks like a Greyhound bus schedule . . . I've been in big, little, Army and abandoned airfields. I've met the friendliest, finest people in the world. I've been greeted with smiles and called sir (this in deference to my years) and while I have run into a few cold potatoes, they were few. . . .

Did you ever spend a rainy day in a railroad station? Did you ever spend a rainy day at an airport? People insist on associating an airport with flying. Rainy days at airports are strictly devoted to developing the intellect by the telling of tall tales. They start off with flying, branch into world politics, problems, religion—and invariably end up on the subject of blondes. Does any other form of transportation take care of one's education so completely?

Next in line is the economy of private flying. The first thing everyone does in figuring flying cost is to put down the initial cost of the plane. That's a fallacy and was devised by some umbrella-carrying accountant who was born under the sign of the Comptometer. Anyone who is nuts about flying and can afford it is going to have a plane anyway. I've had three and I charged them all off to personal weakness. It had nothing to do with business at all. I start from there and count only gas, oil, upkeep and insurance. It's so much cheaper than my car or any other method of travel there is no comparison . . .

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. . . All in all we private flyers have been getting more than we have had to pay for anyway. They get me hotel rooms, they loan me their cars, they hitch rides to town for me, and above all show an interest in me that is far beyond their ordinary line of duty.

They call me Curly when I don't have hair, they call me a venerable old gentleman at 43, they listen to my lies—and brother, I love it. The salesman who can fly and doesn't is missing the most interesting part of living—and hasn't met the world's best folks.

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